Part 4: Summary of changes recommended by staff to Chapter 4 Water Quality

This summary includes all parts of Chapter 4 covered by Officer Report No.12 Water Quality WQL2, as listed under "Matters to be heard" plus other pages throughout NRRP Chapters 4-8 where consequential amendments have been recommended in Officer Report No.12 WQL2.

Note: because of the additional text arising from recommendations, page numbers may no longer match the notified versions of NRRP Chapters 4-8.

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Chapter 4: Water Quality

4.1.2 Social and economic benefits from the use of water

The use of high quality, relatively low cost, water resources in Canterbury has contributed significantly to the regional and national economy and supports settlement throughout the Canterbury region. Urban and rural communities rely on water from rivers, lakes and groundwater for water supplies, agricultural and industrial production, tourism, fisheries, and electricity generation.

A significant proportion of the national power generation occurs from the 8 power stations on the Waitaki River. The Waitaki lakes contain about 60% of the country's hydro-electric water storage, and the scheme supplies about 21% of New Zealand's annual power generation. Smaller quantities of hydroelectric power are generated from power stations on Lake Opuha, Lake Coleridge and the Rangitata Diversion Race at Highbank.

For many decades, it has been common practice to discharge stormwater and wastes from individual households, communities, and from rural and urban industries to water and land. The low level of treatment of point sources of effluent contributed to the economic prosperity of the industries and communities involved, at the expense of the environment and amenity values. Over the past 40 years, legislation and social change has caused waste treatment standards to be progressively improved. Point source discharges are now generally well controlled, and industries have adapted to the changes required and the cost of managing waste is now a routine part of business planning. Economic uses have been developed for some parts of waste streams that were formerly discarded.

Of the water taken from surface or groundwater in the region, over 80% is used for irrigation for agricultural production. About 13% of the water taken is used for public water supply while industry uses about 3%. Since the 1980s, the area of irrigated land in Canterbury has increased significantly from 150,000 hectares to over 350,000 hectares. Over this time irrigation has changed from a 'drought proofing' management approach to an essential input for many farming operations, to satisfy market demands for the quantity and quality of agricultural products.

Tourism is also a significant industry for the region, and it plays an important role in district economies. The natural landscape of the region and its features, such as the braided rivers and glacial lakes, offers a diverse range of experiences for domestic and international tourists. Since the 1990s, the annual number of visitors to Canterbury has increased to over two million visitors per year.

The economic returns from the use of water, e.g. irrigation, and or the presence of water features e.g. tourism, extend into other parts of the region and play an important role in local economies, by supporting service industries providing employment opportunities and sustaining many rural communities.

New Zealand's positive environmental image overseas is used by the tourism and export industries to add 'value' to their goods and services. The demands off-shore markets and New Zealand's marketing strategies are placing increasing obligations on industries to demonstrate that reality matches this image and sustainable production measures are being used.[7]

~~4.1.2~~ 4.1.3[8] Wider community

Awareness throughout the community of the effects of human activities on water quality has increased in recent times. People now have a better understanding of the linkage between human activities and their impacts on water quality. Communities are less tolerant of polluters than a decade ago. This is part of a world wide recognition of the importance of protecting water quality which has led to improved methods for detecting contaminants, tracing their sources, and managing and treating wastes. Over the last 20 years, control of point source discharges has led to a significant improvement in the water quality of degraded

[7] **WQL2.2**

[8] **WQL2.2**

water bodies. Businesses are increasingly conscious of the need to maintain a positive public image in relation to impacts on the environment and to adopt environmentally acceptable policies and practices. The greatest pressures on water quality are now from non-point source discharges. These are the most difficult to manage because reducing the impacts of non-point source discharges involves changes to land management practices and consumption patterns[9]. Education, including the dissemination of information and the promotion of new ideas and methods,[10] will play a key role in increasing awareness of the issues, encouraging the adoption of best practices and sustainable resource use.

~~4.1.3~~ 4.1.4[11] Scope and structure of the chapter

The purpose of this chapter is to set out Environment Canterbury's approach to water quality management in the Canterbury region by stating the water quality issues, establishing water quality outcomes for different types of surface and groundwater bodies, and setting out the policies and methods to achieve these outcomes.

The objectives, policies and methods are organised into the following three sections:

(a) The management of the water quality of Canterbury's rivers and lakes.

(b) The management of the water quality of Canterbury's confined, semi-confined and unconfined aquifers.

(c) Safeguarding the quality of community drinking water sources.

4.2 Framework for water quality management

The management of the region's water resources is based on the interconnected nature of fresh water ecosystems, their physical and biological elements, and the interactions between them.

Water is in a constant state of movement. There is a continual exchange of water and contaminants between rivers, lakes, and aquifers as water moves through a catchment. It is important that the connections between these water bodies are acknowledged and taken into account when managing them.

The rivers, lakes and groundwater of Canterbury can be grouped into different types where water bodies within any one type have broadly similar physical and biological characteristics. Water bodies within a type are generally subject to similar pressures from human activities and respond in a similar way, exhibit similar types of resource management issues, and for these reasons a common set of management provisions can be expected to apply.

A summary of the different water body types and their characteristics in the Canterbury region is contained in Appendix WQL1.

4.2.1 Rivers

For water quality purposes, Canterbury rivers have been grouped together on the basis of two parameters: the dominant source of flow and their geographic zone of origin. The source of flow determines many of the physical attributes of a river, such as seasonality of flows and river size, and the grouping brings together rivers that behave in a similar hydrological manner. The volume of water and the flow regime of a river directly affect the capacity of a river to dilute, assimilate and transport contaminants. The zone of origin represents different parts of the region where the rivers rise, and indirectly, the different contaminant sources, such as geology, type and intensity of land use. The interaction of these two parameters determines the relative susceptibility of different river types to water quality degradation.

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[9] Taylor, R.; Smith, I. (1997) *The State of New Zealand's Environment 1997* Ministry for the Environment, Wellington.

[10] WQL1.45

[11] **WQL2.2**

Many organisms have adapted to specific physical conditions, and therefore changes in the flow regime, water level and quality of water can have a significant influence on the distribution and lifecycles of many plant and animal species.

The general water quality characteristics of the seven major river types are summarised in Table WQL1.

Table WQL1 Water quality characteristics of the major river types in Canterbury

River type	Water quality characteristics
Alpine sourced rivers	~~Large flows of high quality water. High suspended solids and sediment load. High turbidity in glacial fed rivers. Low concentrations of contaminants. Concentrations of faecal coliforms and nutrients increase in the lower reaches. Frequent floods disturb river ecosystems.~~ Large flows of high quality water. High suspended solids and sediment load as a result of active erosion in the Southern Alps. High turbidity in glacial fed rivers. Frequent floods disturb river ecosystems, with fine sediments deposited on river beds as flood flows decline, but these may be re-suspended by subsequent floods. River beds comprise gravel, sand and cobbles. Very low concentrations of nutrients and toxic contaminants. Concentrations of faecal coliforms and nutrients increase in the lower reaches. Colonies of birds in river beds are a source of faecal coliforms. Cool water temperatures and frequent floods reduce susceptibility to the effects of nutrient enrichment, e.g excessive plant growth.[12]
Hill country sourced rivers	~~Generally reasonable water quality. Clarity is good. Nutrient concentrations are high and increase downstream. Nutrient loads depend on catchment geology and land use. Faecal coliform concentrations may be high and may show little variation along the length of a river. Frequent floods disturb river ecosystems.~~ Generally reasonable water quality. Frequent floods disturb river ecosystems, with fine sediments deposited on river beds as flood flows decline, but these may be re-suspended by subsequent floods. River beds comprise gravel, sand and cobbles in greywacke catchments, and finer sediments (silts and muds) in catchments with soft sedimentary rocks. Nutrient loads depend on catchment geology and land use. Very low concentrations of nutrients and toxic contaminants from catchments with greywacke sediments, but higher nutrient concentrations from catchments with soft sedimentary rocks. Faecal coliform concentrations may be high and may show little variation along the length of a river. Colonies of birds in river beds are a source of faecal coliforms.[13]
Lake-sourced rivers	Stable flows. ~~Water quality of the river strongly influenced by the water quality of the lake.~~ Water quality of the river strongly influenced by the water quality of the source lake. Most sediments are retained in the source lake.[14]
Rivers of the upper plains, inland basins and river valleys	~~Small rivers, which are predominantly fed by seepages and springs. Located in inland parts of Canterbury. Low capacity to assimilate contaminants. Water quality variable reflecting the type and intensity of land use. Water clarity is generally good. Some rivers have high water quality, others have high concentrations of nutrients and faecal coliforms.~~ Small rivers, which are predominantly fed by seepages and springs. Located in inland parts of Canterbury. Clean gravel beds. Very low concentrations of nutrients and toxic contaminants from catchments with greywacke sediments or alluvium. Concentrations of nutrients and faecal coliforms vary between rivers reflecting the type and intensity of land use in the catchment. Water clarity is generally good. Low capacity to assimilate contaminants.[15]
Lowland rivers	~~Small rivers, usually spring fed on the lower plains and coastal areas. Low capacity to assimilate contaminants. Intensive land use on heavy soils in the catchments. Water clarity is generally high in many reaches of these water bodies. High concentrations of nutrients and faecal coliforms. Outflow of groundwater via springs may enrich surface water.~~

[12] **WQL1.59**

[13] **WQL1.59**

[14] **WQL1.59**

[15] **WQL1.59**

	Small rivers, usually spring fed, on the lower plains and coastal areas. Low capacity to assimilate contaminants. Water clarity is generally high in many reaches of these water bodies. Low suspended solids and sediment load. Stable flow regime, limited capacity to move sediments. Under natural conditions, clean gravel beds. High concentrations of nutrients and faecal coliforms. Flocks of water fowl and livestock in waterways are a source of faecal coliforms. Outflow of groundwater via springs may enrich surface water. Low capacity to assimilate contaminants.[16]
Volcanic rivers	Short steep catchments that respond rapidly to rainfall. Low capacity to assimilate contaminants. Water clarity high. River bed comprises volcanic rock, but in lower reaches fine sediments (sands, silts and muds) predominate. Moderate concentrations of phosphorus partly derived from volcanic rocks and soils.[17]
Urban	Lowland or volcanic river type, where water quality is strongly influenced by urban development in the catchment.

4.2.2 Lakes

The water quality of lakes is influenced by the location of the lake in the catchment and the type and intensity of activities occurring upstream or in the surrounding catchment. Lake water quality is also affected by the degree of mixing of lake water, and the length of time water is resident within the lake. Generally, high country lakes tend to have very low nutrient concentrations although several smaller lakes surrounded by more intensively used farm land have shown signs of being sensitive to enrichment ~~have elevated nutrient levels~~[18], e.g. Lake Alexandrina. Lowland lakes are enriched and have high nutrient concentrations.

Four types of lakes are recognised in the region. Their water quality characteristics are summarised in Table WQL2.

Table WQL2 Water quality characteristics of the major lake types in Canterbury

Lake type	Water quality characteristics
Large high country lakes controlled and natural	Large (> 8 km^2), deep cold water bodies with very low levels of nutrients. Deeper parts of the lake are well oxygenated. Lakes with non-glacial inflows have very high levels of clarity. In glacial fed lakes fine suspended sediment gives a characteristic colour and hue to the water. Little variation in water temperature or stratification.[19]
Small to medium high country lakes	Small to moderate size (<8 km^2) relatively shallow. Large range in water temperatures. Low to moderate nutrient concentrations. Regular re-suspension of fine bottom sediments may affect water colour and clarity in shallower lakes. Nutrient concentrations are low in unmodified catchments, higher nutrient concentrations occur where there are more intensive landuses.[20]
Coastal lakes	Typically, closed from the sea. Shallow with high temperature range, usually low clarity, often turbid due to an increase in phytoplankton. ~~h~~High nutrient concentrations, usually brackish. High degree of mixing, as a result of wind induced waves, with some connection to the sea affecting salinity concentrations. Outflow of groundwater via springs may enrich surface water.[21]
Artificial lakes	Lakes created by damming a ~~catchment~~ river, impoundment on land or excavation of land. Water quality depends on the local environment including: water residence time; ratio of water depth to size of the lake; quality of inflows; and exposure to wind.[22]

[16] **WQL1.59**

[17] **WQL1.59**

[18] **WQL2.56**

[19] **WQL1.60**

[20] **WQL1.60**

[21] **WQL1.60**

[22] **GEN2.2**

4.2.3 Groundwater

Groundwater in lowland Canterbury is largely contained in a system of unconfined, semi-confined and confined alluvial aquifers. In the inland basins and river valleys, there are alluvial aquifers. Elsewhere in the region, small quantities of groundwater are present in fractured basement rock, such as limestone, greywacke and volcanic rock.

Surface water and groundwater are part of an interconnected hydrologic system that is in a continual process of exchange. ~~In the inland areas of the Canterbury Plains, river water and rainwater enter unconfined aquifers.~~ In the inland areas of the Canterbury Plains, the aquifers are recharged by rain water or snow melt that has percolated down from the land surface, continual seepage from lakes and rivers, or drainage from irrigated land. [23]The water descends into the gravels and travels laterally towards the coast recharging the deep unconfined aquifers of the Canterbury Plains. In the middle and lower plains areas, river and rainfall recharge is thought to stay at shallow levels and flow eastwards over the top of the deeper, older, slower-moving groundwater. Where the water table intersects the land surface the groundwater emerges as springs or seeps in rivers, lakes and wetlands.[24]

Over the Canterbury Plains, ~~G~~groundwater[25] is vulnerable to contamination, particularly from land uses over the aquifer, and from the cumulative effect of land uses occurring in the groundwater catchment. The water quality characteristics and relative susceptibility of different types of aquifers to contamination is shown in Table WQL3.

Table WQL3 Water quality characteristics of the principal aquifer types in Canterbury

Aquifer type	Water quality characteristics	Vulnerability to contamination
Shallow parts of unconfined or semi –confined aquifers	Water quality variable, influenced by geology and overlying land uses.	High risk, because of: • the combination of thin soils, permeable gravels and shallow water table. • the potential for over-abstraction near the coast leading to salt water intrusion.
Deeper parts of unconfined and semi confined aquifers	Generally high water quality. Very low concentrations of nutrients and microbiological contaminants. May be affected by local geology, e.g. buried peat deposits can elevate concentrations of iron and manganese in water.	Moderate risk. Depth to the water table provides some protection, but deep groundwater may still be vulnerable to contamination from persistent or mobile contaminants or land use activities in inland recharge zones. Within semi-confined layers, upward pressure gradient and lower permeability confining layer may provide some natural protection to contamination.
Coastal confined gravel aquifers	Generally very high water quality. In some areas this may be affected by local geology, e.g. buried peat deposits resulting in elevated concentrations of iron and manganese.	Relatively low risk. Upward pressure gradient and confining layers provide a natural barrier to contamination. Over-abstraction could reduce pressures leading to downwards movement of contaminants or lateral salt water intrusion. Land use activities in the area of groundwater recharge may threaten water quality in the long-term.
Non alluvial aquifers	Small yields of water. Water quality is variable and strongly influenced by the geology of the parent material.	Relatively low risk, but dependent on the nature of the fracture system of parent rock. Contaminant movement is difficult to predict.

4.3 Statutory framework

4.3.1 Resource Management Act

The purpose of the Resource Management Act 1991(RMA) is to promote the sustainable management of the ~~region's~~[26] natural and physical resources. Part 3 of the Act sets out

[23] **WQL1.49**

[24] **WQL1.49**

[25] **WQL1.49**

[26] **WQL1.51**

certain duties and restrictions in relation to these resources. Generally, any activity that is likely to affect water is not allowed unless authorised by a resource consent or a rule in a regional plan.

Section 15 controls the discharge of contaminants into the environment. In summary, no person may discharge any contaminant or water into water, any contaminant onto or into land in circumstances which may result in that contaminant (or any other contaminant emanating as a result of natural processes from that contaminant) entering water or any contaminant from any industrial or trade premises onto or into land unless the discharge is expressly allowed by a rule in a regional plan, a resource consent or regulations under the RMA. Other types of contaminant discharges onto or into land may be controlled by a regional rule.

The RMA defines "contaminant" as including:

"any substance (including gases, odorous compounds, liquids, solids, and micro-organisms) or energy (excluding noise) or heat that either by itself or in combination with the same, similar, or other substances, energy or heat –

(a) When discharged into water, changes or is likely to change the physical, chemical, or biological condition of water; or

(b) When discharged onto or into land or into air, changes or is likely to change the physical, chemical, or biological condition of the land or air onto or into which it is discharged.

All discharges to water or onto land where they are likely to enter water are controlled by regional rules in this chapter. Some land use activities that could result in a discharge of contaminants to water are also controlled by regional rules. The RMA provides for varying levels of control to be exercised over activities. Generally, the higher risk of adverse effects on the environment, the higher level of control and oversight of the activity. Activities that are likely to have only minor adverse effects on water quality, aquatic ecosystems, instream values or other users of water are permitted, provided they meet certain performance standards. Where an activity is likely to pose a greater risk to the environment or the nature of the activity is more complex then the activity will require a resource consent. This process will allow the effects of the activity to be considered and conditions specific to the activity placed on the resource consent.

Every person has a general duty to avoid, remedy or mitigate any adverse effect on the environment[27]. This applies to all activities whether they are carried on by a person or by someone else, on behalf of that person, and it also applies whether or not the activity is in accordance with a rule in a plan, a resource consent, or a lawfully established land use.

Activities which are carried out at the time the plan is notified and have not been discontinued for more than six months, may continue until the plan becomes operative, but the activity must comply with the rules of the Transitional Regional Plan where this applies. The effects of the activity must remain the same or of a similar character, intensity and scale. Activities, which commence after the date of notification of the rules in this plan, must comply with the rules in this plan and the Transitional Regional Plan where applicable[28].

Section 30 sets out Environment Canterbury's functions for giving effect to the RMA. In summary these functions include: control of the use of land for the purpose of maintaining and enhancing water quality and ecosystems in water bodies; the prevention or mitigation of any adverse effects of the storage, use and disposal, or transportation of hazardous substances; maintaining indigenous biological diversity;[29] and the control of discharges of contaminants into or onto land, air, or water and discharges of water into water.

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[27] Section 17, RMA 1991

[28] Section 20A, RMA 1991

[29] **WQL1.39**

A regional council may prepare a regional plan to assist it to carry out any of its functions in order to achieve the purpose of the Act[30]. Section 65(3) sets out the particular circumstances when a regional council must consider the desirability of preparing a regional plan.[31]

A regional plan may contain regional rules to regulate or prohibit activities[32], including discharges[33] and land use activities to maintain and enhance water quality[34]. However, a regional council must be satisfied, before including a regional rule in a regional plan authorising a discharge of water or contaminants as a permitted activity, that certain specified adverse effects will not arise after reasonable mixing[35]. The regional plan may also set water quality classes and standards for particular water quality purposes, including those specified in Schedule 3 of the RMA[36]. These standards may be more stringent or specific than those specified in Schedule 3, but a regional council shall not set standards which result, or may result, in a reduction of the quality of the water, outside a mixing zone, at the time of notification of the proposed plan, unless it is consistent with the purpose of the Act.[37]

Section 31 sets out the functions of territorial authorities. These include the control of any actual or potential effects of the use, development, or protection of land, including preventing or mitigating any adverse effects of the storage, use, disposal, transportation of hazardous substances.

4.3.2 Planning Instruments under the RMA

The RMA provides for a hierarchy of planning instruments, at national, regional and district levels. The lower level instruments cannot be inconsistent with those at a higher level.

4.3.2.1 National Policy Statements or National Environmental Statements

The Minister for the Environment may prepare a national policy statement to establish objectives and policies for matters of national significance relating to the use, development, or protection of natural and physical resources. When a national policy statement is approved, a regional council must amend its regional policy statement and its regional plans to give effect to the national policy statement, or take any other action specified[38].

The Crown may set national environmental standards to prescribe technical standards or methods to implement standards. These standards could be set for water quality or soil quality in relation to the discharge of contaminants. These standards will control activities and could override rules in an existing regional plan[39].

4.3.2.2 Water Conservation Orders

Water Conservation Orders apply to the Rakaia, Rangitata and Ahuriri rivers and Lake Ellesmere/Te Waihora. ~~An application has been sought for a water conservation order on the Rangitata River.~~ [40]

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[30] s.63(1) RMA 1991.

[31] **WQL1.51**

[32] s.68 RMA 1991.

[33] s.15 RMA 1991.

[34] s.9(3) RMA 1991.

[35] s.70(1) RMA 1991.

[36] s.69 RMA 1991.

[37] **WQL1.51**

[38] Sections 45 to 55, RMA 1991

[39] Sections 43 to 44, RMA 1991

[40] **WQL1.54, WQL2.28**

~~The Rakaia and Ahuriri River Conservation Orders set water quality standards for discharges to these water bodies. Discharges cannot reduce the water quality below the standard after reasonable mixing. Environment Canterbury must comply with the provisions of an order when granting a discharge permit, and it cannot grant a resource consent for an activity that either itself or combined with the effects of other discharges would contravene the provisions of an order.~~ [41]

The Rakaia, Rangitata and Ahuriri River Water Conservation Orders identify outstanding characteristics and values of these water bodies and provide a statutory framework for maintaining water quantity and quality. These Orders set water quality standards for discharges to identified parts of these water bodies, including hydraulically linked groundwater under the Rangitata Water Conservation Order. Discharges cannot reduce the water quality below the relevant standards after reasonable mixing. ~~Environment Canterbury must comply with the provisions of an order when including a rule in a regional plan or granting a discharge permit, and it cannot grant a resource consent for an activity that either itself or combined with the effects of other discharges would contravene the provisions of an order.~~ [42]

The effect of these Orders is to restrict the scope of the decisions that Environment Canterbury may make on matters addressed by an order, but the RMA does not preclude the regional plan from having provisions that are more stringent than those in a water conservation order, or addressing matters or containing provisions that apply in parts of a catchment not covered by an order. The objectives, policies and methods of Chapter 4 apply to the catchments covered by the Ahuriri, Rangitata and Rakaia rivers Water Conservation Orders. [43]

4.3.2.3 Canterbury Regional Policy Statement

The Canterbury Regional Policy Statement (CRPS) provides the broad policy framework for achieving the integrated management of the region's physical and natural resources. The principal water quality issues are the adverse effects of land use and discharges of contaminants into water or onto land where they may enter water, on the ecological and intrinsic values of water bodies, and the use of these water bodies by present and future generations[44].

For water quality, the overall objective[45] is to "*Enable present and future generations to gain cultural, social, recreational, economic, health and other benefits from the water quality in Canterbury's water bodies and coastal waters, while:*

(a) safeguarding the existing value of water bodies for efficiently providing sources of drinking water for people;

(b) safeguarding the life-supporting capacity of the water, including its associated: aquatic ecosystems, significant habitats of indigenous fauna and areas of significant indigenous vegetation;

(c) safeguarding their existing value for providing mahinga kai for Tāngata Whenua;

(d) protecting wāhi tapu and other wāhi taonga of value to Tāngata Whenua;

(e) preserving the natural character of lakes and rivers and protecting them from inappropriate use and development;

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[41] **WQL1.54**

[42] **WQL1.54**

[43] **WQL2.28**

[44] Chapter 9, Issue 3

[45] Chapter 9, Objective 3

(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 CRPS also establishes policies[46] to reduce the adverse effects of land use and discharges. This is to be achieved by managing the effects of point source and non-point source discharges by setting water quality standards, and identifying and providing for those water bodies which should be sustained in their natural state. Water bodies with degraded water quality are to be improved. Other policies provide guidance for assessing resource consent applications where water quality standards have not been set, or the activity involves the mixing of water from different water bodies[47].

The CRPS recognises that adverse effects on the environment may arise from the storage, use and disposal or transportation of hazardous substances[48]. The objective is to prevent or mitigate any adverse effects on the environment[49]. Chapter 17, Policy 1 sets out the respective responsibilities of Environment Canterbury and territorial authorities for developing objectives, polices and rules for controlling use of land for certain classes of hazardous substances. Environment Canterbury controls the discharge of hazardous substances into or onto land, air or water. Other policies[50] seek to promote better practices for handling hazardous substances, and preventing or mitigating discharges of hazardous substances into the environment.

The CRPS seeks to maintain the indigenous biological diversity of the region by safeguarding regionally significant indigenous habitats from the effects of development and use.[51]

4.3.2.4 Other regional plans

Water quality in the region is ~~currently~~ managed through several regional plans and the water conservation orders. Some of these planning instruments ~~will cease to have effect~~ may be withdrawn when Chapter 4 becomes operative, while others will continue to apply. The current relationship between these instruments and Chapter 4 is described in the Table WQL4.[52]

[46] Chapter 9, Policies 9, 10, 11 and 12.

[47] Chapter 9, Policies 13 and 14.

[48] Chapter 17, Issue 1.

[49] Chapter 17, Objective 1.

[50] Chapter 17, Policies 2, 3 and 4.

[51] **WQL1.39**

[52] **WQL1.50**

Table WQL4 Relationship between existing regional plans and water conservation orders and the Proposed NRRP Chapter 4

Existing regional plans ~~or~~ and[53] water conservation orders	Relationship to ~~Proposed~~[54] NRRP Chapter 4
Canterbury Transitional Regional Plan	The regional rules of the Canterbury Transitional Regional Plan (CTRP) authorising as a permitted activity discharges to land and water, and land use controls on bores and hazardous substance storage continue to have effect throughout the Region until the Canterbury Transitional Regional Plan is withdrawn. Where an activity commences after the date of notification of Variation 1 of the NRRP and the activity is controlled by a rule in both the CTRP and the NRRP, both regional rules must be complied with.[55]
Nelson Marlborough Transitional Regional Plan – Kaikoura District	The regional rules of the Nelson Marlborough Transitional Regional Plan authorising a discharge to land and water as a permitted activity continue to have effect in Kaikoura District until the Nelson Marlborough Transitional Regional Plan is withdrawn. Where an activity commences after the date of notification of Variation 1 of the NRRP and the activity is controlled by a regional rule in both the Nelson Marlborough Transitional Regional Plan and Chapter 4 of the NRRP, both regional rules must be complied with.[56]
Rakaia River Water Conservation Order	~~Any point source discharge into water, including permitted activities, must comply with the water quality standards of the Water Conservation Order in the area where the Order applies~~. ~~The regional rules of the Canterbury Transitional Regional Plan and Chapter 4 of the NRRP, excluding those rules requiring a resource consent for a discharge to surface water, apply to a discharge to the waters identified in Clause (9) of the Order. Any point source discharge into surface water in the waters identified in Clause (9) of the Order that requires resource consent must comply with the water quality standards of the Water Conservation Order.~~[57] The regional rules of the Canterbury Transitional Regional Plan and Chapter 4 of the NRRP apply to any land use or discharge to land or water in the area of the Order. Where Chapter 4 does not specify a water quality class for a water body identified in the Order and a discharge to water requires resource consent, the discharge must comply with the water quality standards of the Water Conservation Order. If both regional rules and the water quality standards of the Order apply to an activity requiring a resource consent, the regional rules shall prevail where these provisions are more stringent than those of the Order.[58]

[53] **WQL1.54**

[54] **WQL1.54**

[55] **WQL1.54**

[56] **WQL1.54**

[57] **WQL1.54**

[58] **WQL2.28**

Existing regional plans ~~or~~ and[53] water conservation orders	Relationship to ~~Proposed~~[54] NRRP Chapter 4
Rangitata River Water Conservation Order	~~The regional rules of the Canterbury Transitional Regional Plan and Chapter 4 of the NRRP, excluding those rules requiring a resource consent for a discharge to surface water, apply to a discharge to the waters identified in Clause (11) of the Order. Any point source discharge into surface water or hydraulically linked groundwater identified in Clause (11) of the Order that requires resource consent must comply with the water quality standards of the Water Conservation Order.~~[59] The regional rules of the Canterbury Transitional Regional Plan and Chapter 4 of the NRRP apply to any land use or discharge to land or water in the area of the Order. Where Chapter 4 does not specify a water quality class for a water body identified in the Order and a discharge to water requires resource consent, the discharge must comply with the water quality standards of the Water Conservation Order. If both regional rules and the water quality standards of the Order apply to an activity requiring a resource consent, the regional rules shall prevail where these provisions are more stringent than those of the Order.[60]
Ahuriri River Water Conservation Order	~~Any point source discharge into water, including permitted activities, must comply with the water quality standards of the Water Conservation Order in the area where the Order applies.~~ ~~The regional rules of the Canterbury Transitional Regional Plan and Chapter 4 of the NRRP, excluding those rules requiring resource consent for a discharge to surface water, apply to a discharge to the "protected waters" identified in the Order. Any point source discharge into surface water in the "protected waters" that requires a resource consent must comply with the water quality standards of the Water Conservation Order.~~[61] The regional rules of the Canterbury Transitional Regional Plan and Chapter 4 of the NRRP apply to any land use or discharge to land or water in the area of the Order. Where Chapter 4 does not specify a water quality class for a water body identified in the Order and a discharge to water requires resource consent, the discharge must comply with the water quality standards of the Water Conservation Order. If both regional rules and the water quality standards of the Order apply to an activity requiring a resource consent, the regional rules shall prevail where these provisions are more stringent than those of the Order.[62]
Lake Ellesmere/Te Waihora Water Conservation Order	~~The provisions of Chapter 4 apply in the area covered by the Order.~~ The regional rules of the Canterbury Transitional Regional Plan and Chapter 4 of the NRRP apply in Lake Ellesmere/Te Waihora.[63]

[59] **WQL1.54**

[60] **WQL2.28**

[61] **WQL1.54**

[62] **WQL2.28**

[63] **WQL1.54**

degraded aquatic habitats and altered the composition of aquatic communities. The waterways are enriched with nutrients, except where the groundwater recharge comes directly from mountain rivers. Nitrogen concentrations exceed national guidelines. However, relatively low concentrations of phosphorus limit excessive plant growths. High concentrations of ammonia occasionally occur. Microbiological concentrations generally exceed contact recreation guidelines and may also exceed stock drinking water guidelines. Poor water quality and sedimentation of the beds of these rivers are the result of intensive rural ~~and urban land uses~~ in the catchments. These waterways receive agricultural runoff, discharges from ~~stormwater systems,~~ [89]field drains and water races. Unrestricted stock access and waterfowl populations also contribute to the poor water quality.

Low concentrations of herbicides, such as simazine and triclopyr, have been detected in some lowland and ~~foot~~hill rivers. Their presence in water is probably a result of agricultural practices.

Streams and rivers draining urban catchments generally have poor water quality as a result of stormwater discharges and runoff from impervious surfaces, such as roads and paved areas. Catchments with predominately industrial or commercial land uses tend to have poorer water quality compared with predominately residential areas. A variety of contaminants are found in stormwater including; sediment, micro-organisms, heavy metals, e.g. zinc and copper, hydrocarbons, pesticides and litter. The highest concentrations of contaminants generally occurs in the "first flush" of stormwater after a dry period. Some contaminants, e.g. hydrocarbons and heavy metals, slowly accumulate in the sediments of a river or estuary eventually resulting in concentrations that can exceed sediment and water quality guidelines. Land development for urban use can generate very high concentrations of sediment in run-off to waterways, after the vegetation cover is removed and the land surface is reshaped. Loess soils, e.g. soils on Banks Peninsula, are particularly susceptible to erosion. As catchments become urbanised, increased run-off causes greater flood flows, and increased river bank erosion that also contributes sediment until the streams and rivers adjust to the new flow regime. It may take many years for the catchment to stabilize and for the accumulated sediment to be flushed from the waterways.[90]

The quality of water discharged from artificial lakes, and lakes on regulated rivers, can be highly influenced by processes occurring in the lake and the depth of the lake from which water is discharged.

4.4.2.2 Lakes

The large high country lakes generally have very high water quality. Smaller lakes or tarns, however, are vulnerable to contamination from agricultural development or settlement in their catchments. For example, Monitoring of Lake Alexandrina water quality has found in the past moderately high nutrient concentrations ~~as a~~ resulting ~~of~~ from agricultural land use and settlement, however recent monitoring shows that the lake is returning to a low nutrient state. ~~in the catchments.~~[91] High stock densities in the lake catchments, grazing in the lake margins, removal of riparian vegetation, high numbers of water birds, sewage effluent from small settlements, and fertiliser use, affect the water quality of these lakes. If land use continues to intensify in the Upper Waitaki catchment, the nutrient concentrations in the lower Waitaki lakes could increase, causing algae to proliferate, consequently reducing water clarity. High nutrient levels create conditions for aquatic plant pests to flourish including those species that can affect hydro-electric generation facilities.

Lowland lakes and coastal lagoons, including Lake Ellesmere/Te Waihora, Lake Forsyth/ Te Wairewa, and Wainono Lagoon, have some of the highest nutrient concentrations of any surface water bodies in the region. This is due to their location at the bottom of catchments where they receive contaminants from rivers and groundwater, from the land surrounding the

[89] **WQL1.59**

[90] **WQL1.59**

[91] **WQL2.56**

Issue WQL1 Surface water quality

(1) The quality of water and bed substrate of many rivers, lakes and wetlands in the region has declined as a result of land use activities and the discharge of contaminants, with the greatest decline occurring in lowland and urban rivers, and coastal lakes. The rivers, lakes and wetlands that still have high natural quality are a limited resource.[102]

(2) The water quality ~~of water~~ and the characteristics of the bed substrate of ~~in~~ rivers, ~~and~~ lakes, artificial watercourses or wetlands, their instream values, and their use by present and future generations, has been or [103]**can be adversely affected by:**

~~**(1) point source or non-point source discharges of contaminants or water into rivers, lakes, or artificial watercourses, or onto land where contaminants may enter water, or**~~

(a) the point source discharge of a contaminant or water directly into surface water, or onto land where it may enter surface water;[104]

(b) non-point and point source discharges of contaminants from land use activities, including, agriculture, and urban or rural-residential land uses, that on their own may have only minor adverse effects but cumulatively cause water quality to decline;[105]

~~**(2)**~~ **(c) the taking, damming, use or diversion of water. ~~in a river that~~:**[106]

(3) These adverse effects include:

(a) ~~increases~~ increasing nitrogen and dissolved phosphorus concentrations. Depending on other factors, increased concentrations of these nutrients above their natural range can cause excessive algal and macrophyte growths, which can reduce water clarity, the amount and type of aquatic habitat, dissolved oxygen concentrations, and mar the appearance and use of the water body;

(b) ~~increases~~ increasing the concentrations of pathogenic micro-organisms, creating a health risk to humans and stock, degrading the mauri of the water, and reducing the value of water bodies for contact recreation, the consumption of mahinga kai, and other cultural activities;

(c) ~~increases~~ increasing sediment yields so that suspended solid concentrations significantly exceed natural levels resulting in reduced water clarity, smothered aquatic habitats, degradation of mahinga kai, and a reduction in the amenity or recreation value of a water body;

(d) ~~discolours~~ discolouration of the water or ~~reduces~~ reduction in water clarity with humic substances or other organic compounds leaching from soils ~~as a result of excessive irrigation causing~~;[107]

(e) changes to the quality of water by the introduction of chemical

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[102] **WQL2.7, WQL2.6**

[103] **WQL2.3, WQL2.6**

[104] **WQL2.3**

[105] **WQL2.5**

[106] **WQL2.3**

[107] **WQL2.12**

contaminants, such as ammonia, hydrocarbons, and synthetic chemical compounds and the by-products of excessive algal growth. Such contaminants can pose a hazard to human health, stock, and aquatic biota, decrease the mauri, affect the palatability of fish,[108] and reduce the value of water bodies for recreation, water supply, mahinga kai and other cultural activities; and

(f) ~~alters~~ alteration to[109] the properties of a water body, such as changing the temperature or the acidity/alkalinity (pH) of the water outside the natural ranges, affecting the aquatic ecosystem, or reducing the value of the water body for recreation, water supply, mahinga kai and other cultural activities.

[108] **WQL2.9**

[109] **WQL2.3**

Objective WQL1: Water quality outcomes for rivers and lakes

Objective WQL1.1 Rivers:

(1) To sustain the environmental qualities of the following rivers by maintaining their water quality and the river bed substrate in a natural state:

- **(a) rivers within, and adjacent to, public conservation land administered by the Department of Conservation;**
- **(b) the Clarence River and tributaries (in the Canterbury region) upstream from the Coastal Marine Area to the headwaters;**
- **(c) the Waiau River mainstem upstream from the Coastal Marine Area, and the Waiau River and tributaries, including the Hope and Boyle rivers, upstream of the confluence with the Hanmer River;**
- **(d) the Hurunui River mainstem upstream of the confluence with the Pahau River, and the Hurunui River and tributaries upstream from the confluence with the Mandamus River;**
- **(e) the Rakaia River and tributaries and the Wilberforce River and tributaries, upstream of the confluence of the Rakaia and Wilberforce rivers;**
- **(f) the Rangitata River mainstem upstream from State Highway One, and the river and tributaries upstream from the water level recorder at Klondyke;**
- **(g) the Orari River and tributaries upstream from the confluence with Black Birch Stream;**
- **(h) the Waitaki River and tributaries above Lake Benmore, including the Twizel, Tekapo, Pukaki, Ohau and Ahuriri rivers and their tributaries;**
- **(i) the Hopkins, Tasman, Cass, Godley and Macaulay rivers and their tributaries; and**
- **(j) any other river identified as Water Quality Class NATURAL on the Planning Maps.**[110]

~~**(1) Where the river water quality or the physical and chemical characteristics of the riverbed substrate are:**~~

- ~~**(a) in a natural state, the water quality and the characteristics of the substrate are maintained in that state; or**~~ [111]
- ~~**(b) not in a natural state, as a result of point source or non-point source discharges, the water quality and the riverbed substrate are maintained or improved so that:**~~
  - ~~**(i) they are suitable for contact recreation in those reaches that are valued for this purpose;**~~
  - ~~**(ii) water is suitable for stock drinking water;**~~
  - ~~**(iii) they are suitable as a habitat for indigenous species or salmonids;**~~
  - ~~**(iv) they provide for amenity values;**~~
  - ~~**(v) they provide for Ngāi Tahu cultural values, including mahinga kai.;**~~
  - ~~**(vi) they maintain indigenous biological diversity.**~~

~~**(2) In addition, where the water quality, or the physical and chemical**~~

[110] **WQL2.28**

[111] **WQL2.28**

~~characteristics of the riverbed substrate:~~

~~(c) equals or is better than the numerical outcomes for indicators of nutrient status and sedimentation of riverbed substrate for the river type, specified in Table WQL5, the water quality and substrate are maintained in that condition; and~~

~~(d) does not meet the outcomes in Table WQL5, the water quality or the characteristics of the substrate are improved so that:~~

~~(i) the outcomes in Table WQL5 are achieved; and~~

~~(ii) there are no visible heterotrophic slime growths in the river.~~ [112]

(2) In all other rivers, the water quality and the characteristics of the riverbed substrate, shall achieve the outcomes specified in Table WQL5.[113]

~~(2) Where the water quality of a river, or the physical and chemical characteristics of the riverbed substrate, have been or are likely to be affected by a change to the flow regime of a river as a result of; augmentation of flow, damming, diversion, or discharge of water or contaminants:~~

~~(a) the instream values in the river, which existed before a change to the flow regime, are provided for, by ensuring that:~~

~~(i) any change to water quality, including changes to; clarity, natural water temperature, dissolved oxygen concentrations, or contaminants caused by reducing or low oxygen conditions;~~

~~(ii) sedimentation of the riverbed; or~~

~~(iii) excessive growth of periphyton, or aquatic plants;~~

~~have no significant adverse effects on the instream values of the river; or~~

~~(b) where the instream values have been adversely affected by a change to the flow regime, the water quality of the river and the physical and chemical characteristics of the riverbed substrate, are improved to restore, as far as practicable, the instream values of the river that existed before the change to the flow regime; and~~

~~(c) the quality of river water recharging groundwater will not prevent the achievement of Objective WQL2.~~[114] [115]

[112] WQL1.39, WQL2.29

[113] WQL2.29

[114] WQL2.48

[115] WQL2.52

Objective WQL1.2 Natural and artificial lakes:

(1) ~~For high country lakes,~~ To sustain the environmental qualities of the following lakes by maintaining their water quality in a natural state[116]

(i) lakes within, and adjacent to, areas of public conservation land administered by the Department of Conservation in the Southern Alps;

(ii) Lake Tennyson;

(iii) lakes in the upper Hurunui River catchment;

(iv) lakes in the Rakaia River catchment above the Rakaia River Gorge, except for the water clarity of Lake Coleridge which shall have a mean annual Secchi depth of more than 12 metres with a standard deviation of 2 metres.

(v) lakes in the upper reaches of the South Branch of the Ashburton River;

(vi) lakes Tekapo, Alexandrina, McGregor[117] **and other lakes in the catchment of the Tekapo River;**

(vii) lakes Pukaki, Ohau and Middleton;

(viii) lakes in the upper reaches of Six Mile Creek, a tributary of Wairepo Creek;

(ix) any other lake identified as Water Quality Class NATURAL on the Planning Maps.[118]

~~(a) where the water quality is in a natural state, it is to be maintained in that state; and~~ [119]

(b) ~~where the water quality is not in a natural state, the water quality is to be maintained or improved so that:~~

(i) ~~it is suitable for contact recreation;~~

(ii) ~~it is suitable as a habitat for indigenous species and salmonids;~~

(iii) ~~it provides for Ngāi Tahu cultural values, including mahinga kai;~~

(iv) ~~the average annual phytoplankton biomass does not exceed five milligrams of chlorophyll a per cubic metre; and,~~

(v) ~~there is no conspicuous change to the visual clarity of the lake.;~~[120]

(vi) it maintains indigenous biological diversity.[121]

(2) For coastal lakes or lagoons that are isolated from or only intermittently connected to the sea, the water quality shall be maintained or where it is necessary, improved so that:

(a) it is suitable as a habitat for indigenous species and trout; and

(b) it[122] **provides for Ngāi Tahu cultural values, including mahinga kai; ~~and~~**[123]

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[116] **WQL2.28**

[117] **WQL2.56**

[118] **WQL2.55**

[119] **WQL2.28**

[120] **WQL2.56**

[121] **WQL1.39**

(c) there are no toxic or nuisance algal blooms~~.~~ and [124]

(d) Lake Ellesmere/Te Waihora is suitable for contact recreation at the Timber Yard Point monitoring site.[125]

(3) For artificial lakes, the water quality of the lake, after reaching a stable state,[126] shall be maintained so that:

(a) it is suitable for ~~the activities and uses for which the lake and its water is used~~ ; and for which the lake was established and is managed.[127]

(b) it does not result in persistent seasonal stratification leading to oxygen depletion in the lake; and

(c) it does not result in toxic or nuisance algal blooms; and

(d) the average annual phytoplankton biomass does not exceed five milligrams of chlorophyll *a* per cubic metre of lake water.

[122] WQL2.64

[123] WQL2.62

[124] WQL2.62

[125] WQL2.62

[126] WQL2.66

[127] WQL2.66, WQL2.67

~~Table WQL5 Numerical outcomes for nutrient indicators and riverbed sedimentation in rivers that are not in a natural state~~

~~River Types (not in a natural state)~~	~~Parts of a catchment~~		~~Emergent macrophytes~~	~~Algae mats greater than three millimetres thick~~	~~Filamentous algae longer than two centimetres~~	~~Periphyton~~		~~Sedimentation of riverbed substrate~~
			~~(percentage cover of width of wetted river channel)~~	~~(percentage cover of wetted river channel)~~	~~(percentage cover of wetted river channel)~~	~~(milligrams Chlorophyll a per square metre)~~		~~(percentage embeddedness)~~
			~~Maximum value~~	~~Maximum value~~	~~Maximum value~~	~~Mean monthly value~~	~~Maximum value~~	
~~Alpine~~			~~N/V~~	~~No conspicuous growths~~	~~No conspicuous growths~~	~~15~~	~~50~~	~~Not to exceed 20 percent~~
~~Rivers of upper plains, inland basins and river valleys~~			~~Not to exceed 50 percent~~					
~~Hill country sourced~~	~~Catchment comprises less than 30 percent Tertiary sediment~~	~~Upstream of State Highway One~~	~~N/V~~	~~Not to exceed 40 percent~~	~~Not to exceed 15 percent~~	~~15~~	~~50~~	
		~~Downstream of State Highway One~~	~~N/V~~		~~Not to exceed 30 percent~~	~~N/V~~	~~100~~	
	~~Catchment comprises more than 30 percent Tertiary sediment~~		~~N/V~~	~~Less than 60 percent~~	~~Not to exceed 30 percent~~	~~N/V~~	~~200~~	
~~Lowland~~			~~Not to exceed 50 percent~~	~~Not to exceed 60 percent~~	~~Not to exceed 30 percent~~	~~N/V~~	~~200~~	~~Not to exceed 40 percent~~
~~Volcanic (Banks Peninsula)~~			~~Not to exceed 50 percent~~	~~N/V~~	~~N/V~~	~~15~~	~~50~~	~~N/V~~
~~Urban~~			~~Not to exceed 50 percent~~	~~Not to exceed 60 percent~~	~~Not to exceed 30 percent~~	~~N/V~~	~~200~~	~~Not to exceed 40 percent~~

~~Explanatory notes:~~ ~~(1) The effects of natural perturbations that may affect; water quality, the growth of aquatic plants, or the characteristics of riverbed substrate, are not included in these values. (2) N/V means no value has been set for this parameter.~~ [128]

[128] **WQL2.29**

Table WQL5 Purpose of Management and Outcomes for rivers which are not in a natural state

River Type	Parts of a river where these outcomes apply	Purpose of Management	Outcomes for Water Quality and Riverbed Substrate								
	Note: The outcomes do not apply to any river or part of a river that is identified on the Planning Maps as Natural State Water Quality.	Note: Each purpose of management is numbered. The outcomes for water quality that underpin each purpose for management are identified in this row.→	Ecosystem Health			Nutrient Status			Sediment		Micro-organisms
			Purposes of management (i), (ii), (v), (vii)			Purposes of management (i), (ii), (iii), (v), (vi), (vii)			Purposes of management (i), (ii), (iii), (iv) (v), (vii)		
			Quantitative Macroinverte-brate Community Index (QMCI)	Dissolved oxygen	Water Temperature	Emergent and Submerged Macrophytes	Algal mats more than three millimetres thick	Filamentous algae longer than two centimetres	Turbidity	Embeddedness	Suitability for Recreation Grade
Alpine sourced rivers	Hurunui River below confluence with Pahau River Rangitata River below State Highway One Waitaki River below Waitaki dam	(i) Ensure diverse and abundant aquatic ecosystems of indigenous flora and fauna (ii) Protect significant habitat of trout or salmon (iii) Maintain amenity values (iv) Ensure water quality is safe for contact recreation (v) Safe-guard Ngai Tahu cultural values including: mauri, mahinga kai, wahi tapu and wahi taonga[129]	A score of 6.0 or more from at least 95 percent of sample sites on a river	90 percent of saturation concen-tration	Water temperature shall not exceed 18°C as a daily mean or 20°C as a daily maximum.	No value set	Algal mats shall not cover more than 5 percent as area of visible substrate in a reach	Filamentous algae shall not cover more than 5 percent as area of visible substrate in a reach	75 percent of samples shall not exceed 20 NTU except in a reach subject to tidal influence, where no value is set	The degree of embeddedness in cobble and gravel substrate shall not exceed 5 percent except in a reach subject to tidal influence, where no value is set.	Good
Rivers of upper plains, inland basins and river valleys	Any part that is not natural state				Water temperature shall not exceed 18°C as a daily mean or 20°C as a daily maximum. In salmon spawning reaches listed in Schedule WQN14 during May – Sept water temperature shall not exceed 11°C	Emergent macrophytes shall not cover more than 20 percent of the width of the wetted river channel at any cross-section. Emergent and submerged macrophytes together shall not cover more than 50			75 percent of samples shall not exceed 2 NTU	The degree of embeddedness in cobble and gravel substrate shall not exceed 5 percent.	Fair

[129] WQL2.18

			(vi) Protect the quality of recharge to groundwater and spring-fed streams (vii) Support the functioning and health of estuaries and coastal lagoons			as a daily maximum	percent of the area of the wetted river channel in a reach.					
Hill country sourced Rivers	Any part that is not natural state, and the catch-ment comprises less than 30 percent Tertiary sediment	Up-stream of State Highway One			80 percent of saturation concen-tration	Water temperature shall not exceed 18°C as a daily mean or 20°C as a daily maximum.	No value set	Algal mats shall not cover more than 20 percent as area of visible substrate in a reach	Filamentous algae shall not cover more than 10 percent as area of visible substrate in a reach	75 percent of samples shall not exceed 2.5 NTU except in a reach subject to tidal influence, where no value is set		Fair to Good
		Down-stream of State Highway One							Filamentous algae shall not cover more than 20 percent as area of visible substrate in a reach.			
	Any part that is not natural state and the catch-ment comprises more than 30 percent Tertiary sediment							Algal mats shall not cover more than 30 percent as area of visible substrate in a reach.				
								Algal mats and filamentous algae together shall not cover more than 40 percent as area of visible substrate in a reach.				
Lowland Rivers	Any part except a reach subject to tidal influence			A score of 5.0 or more from at least 95 percent of sample sites on a river		Water temperature shall not exceed 16°C as a daily mean or 18°C as a daily maximum	Emergent macrophytes shall not cover more than 20 percent of the width of the wetted river channel. Emergent and submerged macrophytes together shall not cover more than 50 percent of the area of the wetted river channel in a reach.	Algal mats shall not cover more than 20 percent as area of visible substrate in a reach	Filamentous algae shall not cover more than 10 percent as area of visible substrate in a reach	75 percent of samples shall not exceed 3 NTU	The degree of embeddedness in cobble and gravel substrate shall not exceed 10 percent except in a reach subject to tidal influence, where no value is set.	Fair
Volcanic Rivers (Banks Peninsula)	Any part except a reach subject to tidal influence		(i) Ensure diverse and abundant aquatic ecosystems of indigenous flora and fauna			Water temperature shall not exceed 18°C as a daily mean or	No value set	No value set	No value set	75 percent	No value set	

		(iii) Maintain amenity values (v) Safe-guard Ngai Tahu cultural values including mauri, mahinga kai, wahi tapu and wahi taonga			20°C as a daily maximum				of samples shall not exceed 3 NTU		Fair
	Lower reaches where the average slope of the bed is less than 5 degrees	In addition to (i), (iii), (v): (iv) Ensure water quality is safe for contact recreation (ii) Protect significant habitat of trout				Emergent macrophytes shall not cover more than 20 percent of the width of the wetted river channel. Emergent and submerged macrophytes together shall not cover more than 50 percent of the area of the wetted river channel in a reach.					
Urban Rivers	Any part except a reach subject to tidal influence	(ii) Protect significant habitat of trout (iii) Maintain amenity values (iv) Ensure water quality is safe for contact recreation	A score of 4.5 or more from at least 95 percent of sample sites on a river		Water temperature shall not exceed 18°C as a daily mean or 20°C as a daily maximum		Algal mats shall not cover more than 30 percent as area of visible substrate in a reach	Filamentous algae shall not cover more than 20 percent as area of visible substrate in a reach	75 percent of samples shall not exceed 5 NTU	The degree of embeddedness in cobble and gravel substrate shall not exceed 10 percent except in a reach subject to tidal influence, where no value is set.	

[130]

[130] **WQL2.30**

Explanation and principal reasons

~~The purpose of the objective is to establish clear water quality outcomes for the region's rivers and lakes. The various river and lake types are shown on the planning maps that accompany this plan. The objective provides a point of reference for measuring the impacts of human activities on water quality and the effectiveness of measures to maintain or improve water quality.~~

~~Natural state water quality occurs where the water quality is unaffected or largely unaffected by human activities. Water bodies, where the water quality is in a natural state, are generally low in nutrients and the riverbed substrate is comprised predominantly of gravels with a relatively small proportion of fine sediment.~~[131]

~~The water quality of many hill country sourced rivers is significantly influenced by the extent of Tertiary age sediments, many of marine origin, in the catchment. These sediments are a source of nutrients and rivers draining these catchments have naturally higher levels of nitrogen and phosphorus. The distribution of these sediments have been mapped and recorded on geological maps.~~

~~Chlorophyll *a* and the presence of algal growths are used as indicators of the nutrient status of rivers and lakes. Chlorophyll *a* is a pigment commonly found in aquatic plants. It provides a measure of the overall productivity of the water body, irrespective of the differing concentrations of nitrogen and phosphorus.~~

~~The growth of algal and other aquatic plants is stimulated by nutrients in the water, and the appearance of aquatic plants provides a readily observable indicator of the degree of enrichment of a water body. Plant growth is limited by the frequency of freshes or floods which scour the vegetation from the bed.~~

~~The input of nutrients from point and non-point sources to water bodies is one the principal causes of water quality decline, resulting in increased aquatic plant and algal growth in water bodies. Excessive plant growth affects aquatic ecosystems and reduces the amenity and recreation values of the water body. The change in nutrient status is a good indicator of the extent and severity of human activities on water quality.~~

~~The accumulation of fine sediment on the beds of small to medium sized rivers, mostly in the lowland parts of Canterbury, has changed the beds of many rivers from predominantly gravel to mostly fine sediments. This has severely reduced the quality of aquatic ecosystems, and affected recreation and aesthetic values of the water bodies. The change in the characteristics of riverbed sediments can be monitored by assessing the "embeddedness" of the substrate, i.e. the proportion of fine sediment to coarse sediments. In addition, some lowland streams, particularly in urban areas, e.g. Avon/Ōtakaro River, have accumulations of contaminants, e.g. lead, copper, or zinc, attached to fine sediments. The Objective therefore sets a limit on the change to the riverbed substrate as a result of sedimentation.~~

~~Many rivers, especially alpine, hill country, and lake sourced rivers, have high water quality, and very low levels of nutrients. These large rivers are a major source of recharge to the region's aquifers. Many rivers and high country lakes are outstanding natural features of Canterbury's landscape and are highly valued by the community. Where the water quality of rivers or lakes currently does not meet the objectives, significant efforts will be required to prevent any further decline in water quality, and improvements water quality may take some time to achieve.~~

~~A combination of narrative and numerical values is used to specify water quality outcomes for rivers and lakes in the Canterbury region.~~

~~The purpose of the Objective WQL1.1(1)(a) is to ensure that the natural state of water quality is retained because the water quality of these rivers is relatively unaffected by human~~

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[131] **WQL2.28**

~~activities. By maintaining these rivers in this state, the water is suitable for a wide range of uses and instream values. The water quality of the rivers is affected by land uses in the catchment.~~ [132]

Objective WQL1 establishes water quality outcomes for Canterbury's rivers and lakes. The region's rivers and lakes are to be managed either to maintain their water quality and river bed substrate in a natural state, or to achieve specific outcomes identified in Table WQL5.

The location of the natural state rivers and lakes described in Objectives WQL1.1(1) and WQL1.2(1) are depicted on the Planning Maps as water quality class "NATURAL". The locations of the various river and lake types are also shown on the Planning Maps.

The purpose of Objective WQL1.1(1) is to maintain the existing quality of the water in rivers and the river bed substrate which remains in, or is close to its natural condition. Natural state water quality means water quality which is unaffected or largely unaffected by human activities.

Natural state rivers justify a high level of protection because of their environmental qualities. These rivers:

(a) form an integral part of the natural landscape; water quality and river bed substrate contribute to the high natural character of these rivers,

(b) are the last remaining unmodified waterways in a largely pristine landscape,

(c) support significant indigenous plant and animal communities,

(d) sustain the relationship between Ngai Tahu, their culture and traditions with ancestral water bodies,

(e) contain important habitats for trout and salmon,

(f) are valued by the community and visitors for their amenity values, especially wild and scenic attributes.

Public conservation land refers to National Parks, Scenic Reserves, Stewardship Areas, Nature Reserves and Recreation Reserves. These areas are primarily managed for conservation and recreation purposes and this use of the land will maintain the natural water quality in the rivers and lakes. The provisions of the Natural Resources Regional Plan complement the Department of Conservation land management objectives for the conservation estate.

The water conservation orders on the Ahuriri, Rangitata and Rakaia rivers establish water quality standards for all or some parts of these catchments. The effect of these orders is to restrict the scope of the decisions that Environment Canterbury may make on matters addressed by an order. However, the RMA does not preclude a regional plan from having provisions that are more stringent than those in a water conservation order, or addressing matters or containing provisions that apply in parts of a catchment not covered by an order. The objectives, policies and methods of Chapter 4 apply to the catchments covered by the water conservation orders for the Ahuriri, Rangitata and Rakaia rivers.

The Tekapo, Pukaki and Ohau rivers are controlled waterways managed for hydro-electric power generation. While this use is recognised to be of national importance, Objective WQL1.1(1) seeks to restore the natural character of these rivers by maintaining natural water quality and improving the natural characteristics of the bed substrate.[133]

The purpose of Objective WQL1.1(1)(b) is to ensure that water quality of rivers continues to be suitable for a wide range of uses and instream values. Ngāi Tahu hold the region's water bodies in high esteem. Sites and some reaches on rivers and tributaries within the takiwa (area) of a rūnanga, are especially significant for cultural or historic reasons. In some places,

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[132] **WQL2.29, WQL2.28**

[133] **WQL2.28**

these rivers and streams are valued for water recreation but are not suitable for this use because of human activities. With the use of appropriate measures, water quality could be improved in these areas and managed so that it meets contact recreation standards.

~~Objective WQL1.1 (2) and Table WQL5 sets outcomes for water quality and sedimentation of riverbeds, so that the rivers will be suitable for a wide range of uses and instream values.~~

The purpose of Objective WQL1.1(2) is to ensure that those rivers or parts of rivers, where the quality of water or river bed substrate is no longer in a natural state, are managed so that the water quality and bed substrate quality support the wide range of uses and values for each river type. These uses and values include:

(a) diversity and abundance of indigenous flora and fauna in, and associated with, these rivers,

(b) trout and salmon habitats,

(c) people's appreciation of the pleasantness and aesthetic qualities of these rivers,

(d) sustain the relationship between Ngai Tahu, their culture and traditions with ancestral water bodies,

(e) recreational uses of water bodies, including fishing swimming, and canoeing,

(f) a source of high quality water for recharge of unconfined aquifers and to mitigate the adverse effects of land uses on groundwater quality,

(g) supporting the ecosystems of estuaries and coastal lagoons into which these rivers flow,

Table WQL5 identifies these uses and values as a series of management purposes for the different river types. It also specifies water quality outcomes for each river type to be achieved by meeting the specific criteria in the table.

The criteria in Table WQL 5 measure the principal water and bed substrate characteristics of rivers. The criteria are relatively easy to measure and form part of the regular environmental monitoring undertaken by Environment Canterbury. As many of these criteria are readily observable, any person should be able to assess to some extent, without requiring specialist equipment, and determine whether the state of a river meets many of the outcomes. No value has been set in Table WQL5 where the criterion is not relevant for that particular river type or part of a catchment.

The water quality and river bed substrate for each river are to meet the criteria set in Table WQL5 for the relevant river type. These criteria encompass all natural and human sources of contaminants, including point and non-point discharges in a catchment, and the influence of other activities, such as changes to the flow of a river or activities in the bed of a river. The influence of natural perturbations are to be excluded when assessing achievement of the outcomes in Table WQL5. The objective provides a point of reference for measuring the impacts of human activities on water quality and the effectiveness of measures to maintain or improve water quality for each river type.

The water and bed substrate quality outcomes for some rivers may vary between different parts of the river because of the influences on water quality, such as the type of geology of some hill river catchments, and the contribution from tributaries in the lower parts of the catchments.

Each criterion in Table WQL 5 contributes towards achieving one or more of the purposes for management of a river type. If the current quality is lower than these outcomes then the policies and methods of the Natural Resources Regional Plan will be used to improve the quality so the outcomes are achieved. If the quality of all or part of a river is currently better than the outcomes specified for that river type, then that quality is to be maintained or improved.

The water quality of many rivers is affected by elevated concentrations of nutrients, particularly nitrogen from land use activities, and faecal micro-organisms from animals,

including birds and livestock. Fine sediment enters these rivers as a result of erosion of the banks, in run-off from adjacent land, or land use activities such as earthworks, and from point source discharges.

Nutrients in the water of these rivers can cause excessive growth of aquatic plants or algae that forms mats or long filaments attached to the cobble river bed substrate. Under natural conditions these aquatic plants and algae provide food and diverse habitat for aquatic organisms. However, excessive growths can detrimentally affect the instream values and uses of a river. The outcomes limit the acceptable extent of area occupied by aquatic plants and algae in a reach of a river. A reach is a relatively homogenous section of river channel.[134]

The concentration of faecal micro-organisms in water indicates the risk of illness from the involuntary ingestion or inhalation of water during contact recreation. The 'suitability for recreation' grading of a site on a river is the Ministry for the Environment classification[135]. Sites graded fair, good or very good are suitable for contact recreation.

Fine sediment in water reduces the clarity and this can adversely affect instream values and the aesthetic values and recreational uses of the river. Where fine sediment accumulates on the bed of a river this can reduce habitat for those organisms that live on or in a gravel substrate or rely on it to thrive. This can lead to changes in the composition of the aquatic community.

Dissolved oxygen and water temperature are critical factors that affect the ability of aquatic organisms to thrive. Oxygen dissolved in the water allows aquatic plants, insects, fish and other organisms to respire. Bacteria use oxygen to decompose organic materials. Introducing relatively large quantities of biodegradable organic materials into a river stimulates bacterial activity that can rapidly consume the available oxygen, outpacing oxygen replenishment from the atmosphere and photosynthesis performed by algae and aquatic plants. Water temperature exerts a strong influence over aquatic organisms. If the overall temperature of an aquatic system is altered, a shift in community composition can be expected. Cold water fish, such as trout and salmon, are sensitive to temperature change. As water temperatures increase above about 20^{o}C they suffer physiological and behavioral stress. Salmon require lower water temperatures for successful breeding.

The Quantitative Macroinvertebrate Community Index (QMCI) is a measure of the diversity and abundance of macro-invertebrates present at a site and is used to assess the response of natural aquatic communities of invertebrates to human induced changes on a water body. A score of 6 or more indicates clean water; between 5-6, possibly slightly degraded; between 4-5, moderately degraded; and less than 4, severely degraded.[136]

Natural perturbations, such as severe floods or droughts, which occur relatively infrequently, will influence the water quality of rivers and lakes. For example, prolonged periods of low flows and high water temperatures may result in excessive growths of aquatic plants and algae. While the criteria in Table WQL5 will at times not be met as a result of natural events, human activities, such as takes dams, diversions discharges , in combination with natural events, will result in the criteria being met less often, and the induced changes on water quality and bed substrate will need to be distinguished from natural events, and managed accordingly.[137] Monitoring of rivers, lakes and climate patterns by Environment Canterbury will be used to distinguish between naturally occurring and human induced changes to water quality and river bed substrate.

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[134] *New Zealand Periphyton Guideline: Detecting, Monitoring and Managing Enrichment of Streams* Ministry for the Environment 2000 **WQL2.29**

[135] *Microbiological Water Quality Guidelines for Marine and Freshwater Recreational Areas* Ministry for the Environment 2003 **WQL2.29**

[136] **WQL2.29**

[137] **WQL2.29**

~~The presence of heterotrophic slime, also known as "sewage fungus", indicates highly enriched conditions resulting from point source discharges containing high concentrations of organic matter.~~

~~In the lower reaches of those hill country rivers that cross the plains, enriched groundwater emerges in the river as seepages and springs, generally downstream of State Highway One. Enriched groundwater may also emerge in some inland rivers, such as the Hakataramea River. During periods of low river flows, groundwater inflow may make up a significant proportion of the river flow, increasing nutrient concentrations in the water, and resulting in prolific aquatic plant growth. Lowland rivers and hill country sourced rivers draining catchments with significant areas of Tertiary sediments generally have the lowest water quality and these rivers may have at times thick algal mats or growths of filamentous algae. For these rivers, high water quality may not be attainable because of the small size of the water bodies, the intensity of land uses in their catchments, their location at the bottom of the catchment, inflows of enriched groundwater, and faecal contamination from populations of waterfowl and riverbed birds. However, some lowland streams have high water quality due to the contribution to flow from high quality groundwater originating from rivers and groundwater where the water quality has not been affected by land uses.~~

~~The rivers and streams of Banks Peninsula are small, and are generally not suitable as a habitat for salmonid species, or used for contact recreation except in the lower reaches and estuaries. The waterways are a habitat for several rare aquatic species that are endemic to Banks Peninsula, valued by Ngāi Tahu, and are used as a source of drinking water.~~

~~The management of the water quality in rivers needs to be taken into account when a flow regime is established for a river[138]. The purpose of Objective WQL1.1(3) is to provide outcomes for the quality of the water or river bed substrate of a river where the flow is regulated or strongly influenced by the discharge or diversion of water. The state of the water quality or river bed substrate reflect the health of a river and its capacity to support instream values. A change to a flow regime from a transfer of water from one river or lake to another, or the damming or diversion of flow from a river, can have significant adverse effects on the water quality and the sediments that comprise the riverbed. These adverse effects may include; a reduction in quality of the receiving water, increasing deposition of fine sediments, a reduction in the capacity of the river to assimilate or dilute contaminants, or flushing out of fine sediments and excessive growths of aquatic plants. In rivers, the instream values may have been lost or diminished as a consequence of the impacts on water quality and river bed substrate as a result of a change to the flow regime.~~ [139]

~~When a statutory flow regime is either established or reviewed under Policies WQN2 to WQN6 in Chapter 5, a new statutory flow regime must provide the conditions to enable water quality and the river bed substrate to support the instream values that existed under a natural flow regime. However, there may be situations where the instream values cannot be fully restored, and in these cases the instream values should be restored to the extent that is technically and economically feasible.~~ [140]

~~Objective WQL 1.1(3)(c) recognises the linkages between the quality of river water recharging groundwater and aquifer water quality. Many rivers, especially the alpine rivers are an important source of recharge for the groundwater system. This river water is generally of very high quality and helps maintain the groundwater in a high quality state and to mitigate the impact of land use activities on groundwater quality.~~ [141]

The purpose of Objective WQL1.2(1) is to maintain the high water quality in high country lakes and to ensure that the low nutrient status of other lakes is maintained. The water

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~~138~~ ~~*Flow guidelines for instream values* Ministry for the Environment, Wellington 2 volumes. May 1998.~~

139 WQL2.48

140 WQL2.48

141 WQL2.48

quality of large high country lakes is still largely in its natural state, and it is the dominant influence on the water quality of the rivers that flow from these lakes. The water quality of smaller lakes is more susceptible to the effects of land uses in their catchments. Water clarity is an important characteristic of lakes as it affects light intensity which in turn controls the depth of macrophyte plant communities in the lake. These plant communities are an important habitat and a significant source of primary production in the lake ecosystem.

Lake Coleridge is a glacial lake and the water level is controlled for hydro-electric power generation. The lake, which formerly had only a few small in-flowing streams and a single small out-flowing stream, now receives water via artificial diversions from the Harper River, Acheron River and Wilberforce River. The flows diverted into the lake often carry naturally high sediment loads. Many of the water quality characteristics of the lake, such as nutrient concentrations, are still close to their natural condition, but as a consequence of the increased input of sediment via the diversions, the water clarity of the lake has declined and is no longer in its natural state. To prevent further decline in water clarity the Objective WQL1.2(1)(iv) sets a limit on change in water clarity. The outcome is intended to ensure that the very high clarity of the lake water is protected so that the lake's aquatic ecosystem is sustained, particularly the deep water macrophyte communities. The water clarity is to be measured at the mid-lake monitoring point.[142]

The purpose of Objective WQL1.2(2) is to maintain coastal lakes in a stable state and to prevent increased enrichment and toxic algal blooms. The present water quality of coastal lakes is the result of; past and present land uses in their catchments, their location at the bottom of a catchment, inflows of enriched groundwater, faecal contamination from populations of birds, and changes in lake levels. The nutrient concentrations and water clarity of these lakes are highly variable, and it is not possible to set a common numerical outcome for these water bodies.

Lake Ellesmere/Te Waihora is used for a range of recreation activities, and monitoring indicates that the lake water quality is likely to meet the microbiological guidelines for contact recreation at Timber Yard Point monitoring site. The other coastal lakes are not generally used or suitable for contact recreation. Toxic blue green algae blooms occur frequently in Lake Forsyth/Waiwera during the summer months making the lake unsuitable for contact recreation. The other smaller coastal lakes are not likely to meet contact recreation guidelines because their small volumes are insufficient to dilute microbiological inputs from birdlife and land uses in the catchment.[143]

Objective WQL 1.2(3) sets minimum water quality outcomes for artificial lakes to ensure that these lakes do not become nutrient enriched, causing excessive algal growths or generating toxic contaminants. Chlorophyll a, is a pigment that is found in plants, and is commonly used as an indicator of biomass and therefore the nutrient status of a lake. It can be used to measure the nutrient status in lakes regardless of their clarity. The 5 mg/m3 limit for Chlorophyll a, which is based on national guidelines[144], denotes the boundary between a moderately enriched lake (mesotrophic) and a highly enriched lake (eutrophic).[145] ~~For the purposes of this Chapter, an artificial lake is one that has been created by human action and the surface area of water exceeds eight hectares at its minimum water level.~~[146]

Artificial lakes are created and managed for specific purposes. The water quality of an artificial lake may be suitable for uses and activities beyond the original purpose of the lake, but it is the responsibility of the manager of the lake to determine the range of uses for the

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[142] WQL2.55

[143] WQL2.62

[144] Burns, N, Bryers, G, and Bowman, E. (2000) Protocol for monitoring trophic levels of New Zealand lakes and reservoirs. Ministry for the Environment, Wellington. 137 pp **WQL2.60, WQL2.72**

[145] WQL2.60, WQL2.72

[146] GEN2.2

lake. Artificial lakes ~~They~~ [147]may be created on dryland sites, in valleys where there are ephemeral streams, or on permanently flowing rivers. These lakes may undergo significant physical and chemical changes ~~after establishment as the lake evolves to an equilibrium state~~. soon after they are created involving the release of soluble nutrients, and organic carbon from the decomposition of organic material. These changes may cause the lake water quality to fluctuate for several years before settling to a relatively stable state.[148] ~~This establishment phase may take several years or longer if there are significant areas of organic-rich soils that have been inundated.~~ The potential changes to water quality that may occur in a new lake need to be anticipated and planned for so that the water quality meets the requirements of Objective WQL1.2(3) and any discharges to surface water meet the relevant receiving water quality standards.[149] Seasonal processes, such as temperature stratification, may also occur in areas sheltered from significant wind mixing. Sometimes, this stratification and subsequent lack of mixing of lake water may lead to the depletion of oxygen or anoxia in the cold, bottom-water zone (hypolimnion) of the lake, and the generation of toxic contaminants and soluble nutrients.

[147] **WQL2.66**

[148] **WQL2.66**

[149] **WQL2.66**

Policy WQL1 Point source discharges to surface water

(1) Before allowing a point source discharge of:

(a) a contaminant, excluding those contaminants specified in Policy WQL 2, into surface water or onto land where a contaminant may enter surface water, ensure that:

(i) best practice measures are or will be applied to avoid the production of the contaminant, or to reuse, recover, or recycle materials and treat waste [150] to minimise the volume and concentration of the contaminant in the discharge, and

(ii) the discharge to another existing treatment and discharge system or network is not a practical alternative, and a discharge into or onto land cannot be undertaken in accordance with Policy WQL6.; or[151]

(b) water into surface water[152], including water from one catchment being discharged into another part of the same catchment or into another catchment, ensure that:

(i) the mixing of the waters as a result of the discharge avoids ~~significant~~[153] adverse effects on Ngāi Tahu cultural values; and

(ii) the discharge of water will not facilitate the movement of pest plant or animal species, or other ~~exotic~~ unwanted species, between catchments; and[154]

(iii) the discharge of water will not result in the introduction of plant and animal species that do not naturally occur in the receiving catchment.~~, and~~

~~(iv) the discharge of water will not significantly alter the water quality, or characteristics of the bed substrate, aquatic ecosystems or values of the receiving water body, and the water of the river or lake continues to meet the relevant outcomes in Objective WQL1.~~[155]

(2) If the requirements of Policy WQL1(1) are satisfied and a discharge of a contaminant or water into water in a river or lake is ~~necessary~~to be allowed[156]:

(a) the water quality standards in Schedule WQL1 for that river or lake shall be met at the point of discharge where the discharge occurs within;

(i) one kilometre upstream in a river, or

(ii) one kilometre radius in a lake,

from a community drinking water supply intake;[157]

(b) the water quality as a result of the discharge outside of the Zone of Non-

[150] **WQL2.92**

[151] **WQL2.93**

[152] **WQL2.94**

[153] **WQL2.95**

[154] **WQL2.96**

[155] **WQL2.98**

[156] **WQL2.99**

[157] **WQL2.106**

Compliance, shall meet the standards for the relevant water quality class specified in Schedule WQL1, or the water quality standards of a water conservation order, if relevant; and[158]

(c)~~(a)~~ the following matters shall apply when determining the size and any adverse effect of a Zone of Non-Compliance~~, where the water quality standards for the river or lake may not be achieved:~~[159]

(i) the discharge of a contaminant shall be into water and the Zone shall be as small as practicable, and either alone, or in combination with other Zones of Non-Compliance shall not occupy a significant proportion of the receiving water body; and

(ii) ~~take into account~~ the assimilative capacity of the receiving water assessed under the 7 day 10 year low flow conditions for a ~~the~~ river, or low level~~s~~ with a 10 year recurrence interval [160]**for a lake, or the equivalent flow or level where the flow has been modified by any take, use, dam, diversion or discharge; and**

(iii) the Zone shall not create a barrier to ~~fish~~ the migration of fish or other aquatic organisms, [161]**or limit contact recreation in areas listed in Schedule WQL7 ~~which support high levels of use~~**[162]**; and**

(iv) the Zone shall not result in a significant impact on Ngāi Tahu cultural values; and

(v) the discharge shall not result in the accumulation of persistent compounds in aquatic ecosystem or in sediment within the Zone of Non-Compliance.~~; and~~

~~(b) the water quality, outside of the Zone of Non-Compliance in a river or lake shall meet the standards specified for that river or lake either in Schedule WQL1 or in a relevant water conservation order.~~[163]

(3) Where the existing surface water quality does not[164] **meet the water quality standard for the water body specified in Schedule WQL1, the discharge shall not be allowed unless it can be demonstrated that the adverse effects of the discharge on the receiving water quality, outside of the Zone of Non-Compliance, are not likely to result in water quality which is less than the water quality standard set for the receiving water.**

~~(4) Where the discharge occurs within the following areas, the water quality standard for that river or lake shall be met at the point of discharge:~~

~~(a) within one kilometre upstream in a river, or within a one kilometre radius on a lake, from an intake for a community drinking water supply;~~

~~(b) in a river where the flow is to be maintained in a natural state;~~

~~(c) an area identified as a significant spawning reach for salmon.~~[165]

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[158] **WQL2.89**

[159] **WQL2.101**

[160] **WQL2.100**

[161] **WQL2.100**

[162] **WQL2.101**

[163] **WQL2.89**

[164] **WQL2.104**

[165] **WQL2.106**

Explanation and principal reasons

This policy applies to a discharge of contaminants or water from a point source that flows from a pipe or an outfall, either directly or over land, into a surface water body.

Under Section 15 (1) of the Resource Management Act, no person may discharge a contaminant into water or onto land where it may enter water unless it is expressly allowed by a regional rule or a resource consent. Some types of land management activities, such as the application of fertiliser, can result in the discharge of contaminants into water. Under Section 69, a regional council may establish water classes with associated water quality standards, but subject to the need to allow for reasonable mixing of a discharge of a contaminant or water, the standards cannot result in a reduction of the existing water quality unless it is consistent with the purpose of the Act.

The water quality classes and associated water quality standards established under the NRRP are set out in Schedule WQL1. The water quality classes are to be used to establish the extent of allowable effects on water quality and the quality of river or lake bed substrate that may result from a point source discharge to water, or onto land where a contaminant in the discharge may enter surface water. In a water body classified as Water Quality Class 'NATURAL', the standards require that, outside the Zone of Non-Compliance, no change to the water quality is allowed as a result of the discharge. For other rivers and lakes, the water quality standards that are to be achieved outside the Zone of Non-Compliance have been developed from national water quality guidelines. The water quality standards do not take into account changes to water quality or bed substrate quality that result from natural events, such as floods.[166]

Policy WQL1(1) establishes a two-step process for considering a point discharge of contaminants ~~or water~~[167] into water. The purpose of Policy WQL1(1)(a) is to ensure that anyone considering a point source discharge of contaminants into a surface water body systematically applies the waste management hierarchy to reduce the volume and concentration of the waste. This approach is consistent with the New Zealand Waste Strategy[168] which establishes national targets for waste minimisation. If, after applying the waste management hierarchy, a discharge cannot be avoided, then the options of discharging to land, or via another[169] existing waste treatment system are to be evaluated.

The purpose of Policy WQL1(1)(b) is to consider the potential effects on a receiving water body ~~overall~~ from a discharge of water, for example, the transfer of water within or between ~~from another~~ catchments, or from a dam or canal. ~~Some l~~Large-scale discharges~~, such as an inter-catchment transfer of water,~~ of very different water quality~~,~~[170] can have impacts on the receiving water body. These adverse effects may extend far beyond the immediate area of the discharge and could fundamentally change the water quality, aquatic ecosystems or adversely affect the values of the receiving water body. The purpose of these criteria is to ensure that these widespread adverse effects are taken into account when an application for a discharge permit is considered. If the adverse effects on the receiving water body are judged to be acceptable, and a discharge to water is to occur, then the extent of the effects on the receiving water body in the vicinity of the discharge are to be considered under Policy WQL 1(2).

Policy WQL1(2)~~(a)~~ establishes criteria for determining the size of a mixing zone so that the discharge does not compromise the values of the water body and the aquatic ecosystem. In

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[166] **WQL2.89**

[167] **WQL2.89**

[168] *The New Zealand Waste Strategy: towards zero waste and a sustainable New Zealand* Ministry for the Environment report number 422, Wellington, March 2002. 48 pp.

[169] **WQL2.93**

[170] **WQL2.89**

the vicinity of an outfall, there will be a zone where the discharge mixes with the receiving water, and the receiving water standards will not be complied with. This is called the "Zone of Non-Compliance".[171] The boundary of the zone defines the point at which reasonable mixing has occurred and the water quality standards are met. In each case, the size of the zone will depend on the flow regime and water quality characteristics of the receiving water body, the type of contaminants, the level of treatment and flow rate of the discharge, and the design of the outfall.

The size of the zone is to be determined under low river flow in a 7 day period once in every 10 years and lake level conditions that could be expected to occur about once every 10 years, when the dilution and dispersion provided by the river or lake will be significantly reduced and the potential for adverse effects on water quality and ecosystems increased. While these are not the worst case flows or levels, such conditions could be reasonably expected to occur during the period of a discharge permit, therefore it is appropriate that the extent of the area in which water quality standards will not be achieved is calculated under such conditions.[172]

For discharges of water into water, water quality standards in the receiving water are to be met. Where the discharge consists of water from another catchment this policy must be considered in conjunction with Policy WQN21 in Chapter 5.

There will be situations where the existing water quality does not meet the water quality standard for the water body because of existing discharges and land use activities. The purpose of Policy WQL1(3) is to require that the resource consent conditions on a discharge permit will ensure that the water quality standard for the receiving water body will be achieved. Other complementary measures will also be needed to improve the background water quality so that it meets the water quality standard.

~~For some rivers or lakes, or parts thereof, a Zone of Non-Compliance will generally be incompatible with the values of the water body. Policy WQL1(4) identifies those water bodies where a Zone of Non-Compliance should not be established. These include rivers listed in Table WQN17, Schedule WQN 5, and schedule WQN 14.~~[173]

Methods

The methods used or to be used to implement Policy WQL1 are:

Method WQL1(a) Information and promotion

Environment Canterbury will:

(a) provide information and work with landholders, community and industry groups, territorial authorities and other organisations:

  (i) to educate and to raise community awareness about the potential adverse effects of discharging contaminants into surface water bodies;

  (ii) to promote appropriate means of disposal and methods to prevent the entry of contaminants into network systems;

  (iii) to reduce the effects of land use activities on specific water bodies; and

  (iv) to promote management practices and techniques to discourage stock from entering water bodies, for example, by providing alternative sources of drinking water, planting of shade trees, installation of stock crossings, and riparian fencing.

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[171] Rutherford, K.; Zurr, B.; Race, P. (1994) *Reasonable mixing: a discussion of reasonable mixing in water quality management.* Resource Management Ideas no. 10, Ministry for the Environment, Wellington. August 1994. 15 pp.

[172] **WQL2.100**

[173] **WQL2.106**

(b) undertake water education programmes in schools and communities so that people will value and care for Canterbury's water resources.

(c) promote the development and implementation of waste minimisation and management programmes for industry.

Methods of information transfer include; field days, workshops, demonstration sites, media items, Environment Canterbury's website, teaching materials, fact sheets.

Method WQL1(b) Investigations

Environment Canterbury will:

(a) where appropriate, undertake or support investigations of;

  (i) the effects of industrial air discharges on stormwater quality from hard surfaces in the vicinity of the discharge.

  (ii) the feasibility of using environmental management systems for industries or commercial enterprises to monitor and manage the effects on surface water quality of their activities.

(b) in conjunction with rūnanga and Te Rūnanga o Ngāi Tahu, identify sites or areas of significance to Ngāi Tahu in or adjacent to water bodies, or in areas where water related activities could cause significant adverse effects on sites or areas of significance. As appropriate, these sites and areas will be brought into the Proposed Canterbury Natural Resources Regional Plan by way of RMA Schedule 1 processes.

Method WQL1(c) Response to complaints and enquiries

Environment Canterbury will:

(a) provide a 24-hour capability to respond to any complaints or incidents of point source discharges to rivers and lakes or to land in a manner where it is likely to enter water.

(b) maintain a database to record the details of any complaints or incidents and the response by Environment Canterbury or other agencies.

Method WQL1(d) Regional rules

Environment Canterbury will apply Regional Rules WQL4, WQL7, WQL14, WQL21, WQL 55, WQL56, and WQL60 in Section 4.6 to give effect to Policy WQL1.

Method WQL1(e) Resource consents

Resource consents may be granted for activities which discharge contaminants from point sources into surface water bodies or a discharge to land where it may enter a surface water body. Each discharge permit will have specific conditions imposed to ensure that either adverse effects of the discharge on water quality will ~~not result in the water quality standards being exceeded~~ be in accordance with Policy WQL1[174], or that the adverse effects on water quality will be minor.

When regional rules controlling the discharge of contaminants to water become operative, Environment Canterbury may serve notice, under section 128 of the RMA, on the holders of all such resource consents, of its intention to review the conditions of their resource consents, where in Environment Canterbury's opinion, it is appropriate to do so in order to enable water quality standards set by this plan to be met.

Conditions on a resource consent may also require:

(a) a financial contribution be made by the consent holder to mitigate or remedy the adverse effects of any point source discharge on a water body; or

(b) a bond be imposed on the consent holder to ensure compliance with conditions on a resource consent.

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[174] **WQL2.113**

When considering the duration of any resource consent, Environment Canterbury will set the duration of the resource consent for as long as is consistent with the purpose of the RMA, and shall have particular regard to the matters set out in Section 1.3.5 and to the guidelines for consent duration set out in Sections 4.8 and 4.9. [175]

Method WQL1(f) Compliance monitoring and enforcement

Environment Canterbury will monitor and enforce compliance with the conditions of permitted activities and of any resource consent it has granted. Environment Canterbury may apply for enforcement orders, issue abatement notices and infringement notices, and use other enforcement mechanisms in Part 12 of the RMA, to enforce the rules of Chapter 4, or a breach of resource consent conditions.

An enforcement order or abatement notice can require a person to do something that is necessary in order to avoid, remedy, or mitigate any actual or likely adverse effect on the environment caused, by, or on behalf of that person.

Method WQL1(g) Territorial authorities

Territorial authorities in the preparation, variation, change or review of their district plan or the exercise of their functions:

(a) shall take into account the adverse effects of land use change on the water quality of aquifers, rivers and lakes ~~in hill and high country areas and inland basins~~[176], and implement measures to avoid these effects; particularly from:

  (i) an increase to the area or density of an existing settlement; or

  (ii) the subdivision and subsequent use of land for residential, commercial, rural residential or industrial land uses; and

(b) should prepare a~~n integrated~~[177] management plan to manage current and future stormwater discharges in a stormwater catchment area where more than 30 percent of the land area of the catchment is used or proposed for use for industrial, commercial or residential activities.

Policy WQL2: Effects on water quality and river bed characteristics caused by a change to the flow of a river

(1) Where the water quality or the physical and chemical characteristics of the bed of a river is likely to be affected by a change to the flow of a river as a result of a proposed activity, or setting or reviewing a flow regime in accordance with Policies WQN3, WQN4 and WQN5[178], ensure that any change to:

(a) the water quality, including changes to clarity, natural water temperature, dissolved oxygen concentrations, or concentration of contaminants caused by reducing or low oxygen conditions;

(b) the sedimentation of the river bed; or

(c) growth of periphyton or aquatic plants;

will not have a significant adverse effect on the water quality or the characteristics of the bed of a natural state river identified in Objective WQL1.1(1), or the purpose of management and outcomes identified in Table WQL5 for any other river.

[175] **GEN1.102**

[176] **WQL2.116**

[177] **WQL2.117**

[178] **WQL2.45**

(2) When deciding an application for a resource consent for an existing activity that has changed the flow of a river, affecting the water quality or the characteristics of the river bed causing more than a minor adverse effect on an instream value:[179]

(a) impose conditions to improve the water quality and characteristics of the river bed, to restore, as far as practicable, the instream value that existed before the flow of the river was changed; or

(b) if an alteration to the flow regime will not restore water quality, river bed substrate or instream values to a significant extent, then the adverse effects on the river and its instream values are to be mitigated by restoring or enhancing instream values on another reach of the same river[180]**; or**

(3) Any change to the quality of river water recharging groundwater should not prevent the achievement of Objective WQL2.[181]

Explanation and principal reasons

Rivers are dynamic systems that are strongly influenced by the interplay of hydraulic, physical and chemical factors, such as, velocity, and depth, the type of substrate, frequency of floods and water quality. A change in one of these factors may have wide-ranging effects on a river and its instream values, and consequently these factors must be managed in an integrated manner.

Activities, such as taking water, augmentation, damming, diversion of a river or a discharge of water or a contaminant, can have significant adverse effects on water quality or the river bed substrate. Examples of adverse effects include:

- reducing flow in a river diminishes the capacity of that river to dilute contaminants sourced from its catchment,
- preventing or reducing the flow-induced movement of sediment downstream, can enhance bed armouring thereby create a more favourable environment for periphyton to flourish,
- a reduction or decrease in the frequency of small to medium size floods reduces the ability of a river to remove excessive accumulations of sediment, periphyton and particulate organic material,
- a reduction in the river flow velocity may cause increased macrophyte growth and may favour nuisance filamentous periphyton species over thin diatom communities, if there are sufficient nutrients in the river,
- reduced river flow can increase water temperature that may threaten aquatic biota and lead to reduced dissolved oxygen levels and increased rates of plant growth,
- artificial lakes, formed by dammed rivers, may become eutrophic and discharge nutrient enriched and/or green-coloured algae-laden water downstream,
- artificial lakes that thermally stratify may release cold, deoxygenated lake-bottom water into warmer river water downstream, or may release warmed surface water into colder river water downstream,
- artificial lakes that trap fine sediment may increase the clarity and alter the colour of water discharged to a river downstream.

[179] **WQL2.43**

[180] **WQL2.52**

[181] **WQL2.48**

The purpose of Policy WQL 2 is to ensure that any change to water quality of a river or the river bed substrate and consequential effects on instream values are taken into account when a flow regime is established for a river or an activity results in a change to the flow of a river. Each river will need to be assessed on a case by case basis because the circumstances are likely to be different in each situation.

Policy WQL2(1)(a) applies to new activities that are provided for under Policies WQN3, WQN4, or WQN14 of Chapter 5 and to a flow regime established or reviewed by Environment Canterbury under Policies WQN3 to WQN5 of Chapter 5. The scale of adverse effects on a river and its instream values may range from minor to significant. The term 'no significant adverse effects' sets an upper limit on the scale and extent of adverse effects that are acceptable while ensuring that Objective WQL 1 is achieved . This allows scope for the consent authority to consider appropriate measures to avoid, remedy or mitigate any adverse effects resulting from an activity that changes the flow of a river.

Policy WQL 2(2) applies when an application is made to replace a resource consent for an existing activity, or review or change the conditions of an existing resource consent, and this requires an assessment of the adverse effects caused by the change to the flow of the river. If the adverse effects are contrary to Part 2 of the RMA, these are not to be allowed to continue. A replacement resource consent may not necessarily be granted, or renewed on the same conditions as the previous consent.[182]

The scale of adverse effects on a river and its values from an existing activity may range from negligible through to significant. The words "more than minor" set a threshold above which adverse effects are to be managed. Each situation will require a judgment to be made, after considering the state of the river environment, technical and economic factors as to whether an improvement in water quality and river substrate is feasible and if this will restore instream values.[183]

The existing environment, which includes all built structures, such as dams, weirs or stopbanks, will be the starting point for determining whether restoration is feasible. Large-scale activities, such as the existing dams on the Waitaki River, which have caused a permanent change to the river and will continue for the foreseeable future, are considered to be part of the existing environment.

Where an existing activity, such as a hydro-electric dam, is for all practicable purposes a permanent feature, changes to way that the activity is undertaken, such as altering the operating conditions, or the timing or frequency of a discharge, should be considered to improve the water quality and riverbed substrate and to restore or enhance the instream values that formerly existed in the river. The restoration of the instream values means that the values can be restored to an extent and within a period that is acceptable to other users of the river and the community, and that the natural values are, to a large extent self-sustaining.

Policy WQL2(2) also recognises that in some situations, a change to the management or operation of the activity will not restore the instream values that existed before the activity commenced. In these cases measures are to be applied to offset the adverse effects of the existing activity by restoring the instream values, where practicable, on another part of the river.[184]

Policy WQL 2(3) acknowledges the linkage between the quality of river water recharging groundwater and aquifer water quality. Many rivers, especially the alpine rivers are an important source of recharge for the groundwater system. This river water is generally of

[182] **WQL2.43**

[183] **WQL2.43**

[184] **WQL2.52**

very high quality and helps maintain the groundwater in a high quality state and to mitigate the impact of land use activities on groundwater quality.[185]

Methods

(a) The methods used or to be used to implement Policy WQL2 are:

Method WQL2(a) Response to complaints and enquiries

Environment Canterbury will:

(a) provide a 24-hour capability to respond to any complaints or incidents about the taking damming, or diversion of water, or the discharge of water and contaminants.

(b) maintain a database to record the details of any complaints or incidents and the response by Environment Canterbury or other agencies.

Method WQL2(b) Regional rules

Environment Canterbury will apply Regional Rules WQN3,WQN6, WQN7, WQN8, WQN9, WQN10, WQN40, WQN41, WQN42 in Section 5.6, and Regional Rule WQL56 in Section 4.6 to give effect to Policy WQL2.

Method WQL2(c) Resource consents

Resource consents may be granted for activities which alter the flow of river, such as, taking, damming, diversion or discharge of water. Each resource consent will have specific conditions imposed to ensure that adverse effects on water quality or instream values are to be managed in accordance with Policy WQL2.

When a flow regime in Schedule WQN1 becomes operative, Environment Canterbury may serve notice, under section 128 of the RMA, on the holders of all water permits, of its intention to review the conditions of their permits, where in Environment Canterbury's opinion, it is appropriate to do so to enable the flow regime set by this plan to be met.

When a consent holder applies under s127 of the RMA to change or cancel any condition of a resource consent that authorises an activity that changes the flow of a river, Environment Canterbury will consider the application in accordance with Policy WQL2 and any other relevant provisions of this plan.

Environment Canterbury may also, in accordance with s108 and s108A of the RMA, impose conditions on a resource consent that require:

(a) a financial contribution to be made by the consent holder to mitigate or remedy the adverse effects of any taking, damming, diversion of water or discharge on a water body; or

(b) a bond be imposed on the consent holder to ensure compliance with conditions on a resource consent.

Method WQL2(d) Compliance monitoring and enforcement

(a) Environment Canterbury will monitor and enforce compliance with the conditions of any resource consent it has granted. Environment Canterbury may apply for enforcement orders, issue abatement notices and infringement notices, and use other enforcement mechanisms in Part 12 of the RMA, to enforce the rules of Chapter 4 and Chapter 5, or a breach of resource consent conditions.

(b) An enforcement order or abatement notice can require a person to do something that is necessary in order to avoid, remedy, or mitigate any actual or likely adverse effect on the environment caused, by, or on behalf of that person.[186]

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[185] **WQL2.48**

[186] **WQL2.48**

Policy WQL2 Prevent the discharge of certain contaminants to surface water

Avoid significant adverse effects on water quality, aquatic ecosystems and ~~associated~~ instream[187] ~~ecological, amenity and cultural~~ values[188] of surface water, by:

(1) prohibiting the point source discharge of:

(a) untreated human sewage, animal effluent from an effluent collection system, or solid or hazardous waste into surface water, or onto or into land where contaminants may enter surface water; or

(b) treated human sewage into a river or lake from a vessel; or

(c) treated human sewage into a river upstream of a community drinking water supply intake.

(2) requiring that a community system used to collect, treat and discharge human sewage effluent:

(a) treats the effluent using the best practicable option~~to a high standard and discharges~~ and the effluent is discharged onto or into land in accordance with Policy WQL6(1) and Policy WQL12, but not within ~~a community drinking water supply protection zone or~~[189] [190] the Christchurch Groundwater Recharge Zone; and

(b) has in place effective measures to prevent effluent discharging to surface water or onto land where it may enter surface water, ~~from a network~~ [191] in the event of a system failure or overloading of the system beyond its design capacity.

(3) only allowing a discharge of treated sewage to a river or an artificial watercourse in circumstances where:

(a) it is not practicable to:

(i) discharge the treated sewage effluent onto or into land because of the physical limitations of the land, or the discharge would contravene Policy WQL6; or

(ii) use individual onsite sewage effluent treatment and disposal systems to discharge onto or into land[192] because the cumulative effects of the discharges on groundwater quality would contravene Policy WQL6; or

(iii) establish sewage effluent collection systems and remove sewage effluent for disposal offsite; and

(b) the discharge is in accordance with Policy WQL1 and any adverse effects on the receiving water quality, aquatic ecosystems and instream values, including[193] Ngāi Tahu cultural values, and amenity values are no more than minor.

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[187] **WQL2.126**

[188] **WQL2.135**

[189] **WQL2.130**

[190] **WQL2.131**

[191] **WQL2.132**

[192] **WQL2.134**

[193] **WQL2.126, WQL2.135**

(4) prohibiting the discharge of a hazardous substance to surface water, or onto land where a hazardous substance may enter surface water, except where the discharge is necessary to control vegetation or animal pests, or it is required for the installation and maintenance of structures in ~~a river or lake bed~~ the bed of a river or lake, or in an artificial water course[194], and provided that the following requirements are met:

(a) there will be no significant adverse effects on other organisms or on the use and consumption of water by humans ~~hazardous substance is of low toxicity to aquatic organisms,~~; and

(b) the hazardous substance is registered by the Environmental Risk Management Authority for use against~~other than to~~ the target organism~~,~~; and

(c) the substance is not persistent in the aquatic environment.~~; and~~[195]

~~(b) the hazardous substance is used or applied in accordance with:~~

~~(i) the manufacturer's instructions, or any relevant code of practice; and~~

~~(ii) any requirements for the use of the substance laid down by the Environmental Risk Management Authority; and~~

~~(iii) conditions of a regional rule or a resource consent; and~~

~~(c) any person applying hazardous substances for a commercial use has appropriate training and qualifications~~.[196]

(5) minimising the risk of an accidental discharge of a hazardous substance into surface water. Measures to minimise the risk include requirements that:

(a) a hazardous facility, waste storage facility, or a pipeline used to transport a hazardous substance,[197] should not be located where there is a significant risk that the facility or pipeline could be:

(i) flooded; or

(ii) affected by subsidence or slippage of land; or

(iii) disrupted by permanent ground deformation as a result of movement on an active fault line; and

~~there is a practical possibility of a discharge entering a river or lake; and~~[198]

(b) best practices are used in the design, construction and use of a hazardous facility, waste storage facility, or a pipeline, used to transport a hazardous substance,[199] to prevent a ~~discharge~~ hazardous substance entering a stormwater system that discharges to surface water,[200] or entering surface water as a result of:

(i) routine use of a hazardous substance; or

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[194] WQL2.136

[195] WQL2.136, WQL2.137

[196] WQL2.137

[197] WQL2.142

[198] WQL2.143

[199] WQL2.142

[200] WQL2.143

[201] WQL2.136

(ii) an emergency situation; or[201]

(iii)~~(ii)~~ leakage from a facility or pipeline; or

(iv)~~(iii)~~ seismic activity that is likely to result in structural damage from ground motion or liquefaction.

Explanation and principal reasons

The purpose of this policy is to prevent discharges into surface water that pose a significant risk to surface water quality, or the aquatic environment. However, in some circumstances, a discharge of these contaminants into surface water may be allowed. Where a discharge is considered necessary, it must comply with the provisions of Policy WQL1(2), WQL1(3) or WQL 1(4).

Policy WQL2(1) prohibits the discharge of certain contaminants into surface water. For most of the community, discharges of untreated wastes into surface water bodies are no longer acceptable activities because of their effects on water quality, aquatic ecosystems, and cultural and amenity values. This includes discharges from toilets or sewerage systems on boats or vessels on rivers and lakes.

The discharge of human sewage into surface water is offensive to the cultural values of Ngāi Tahu and many other people in Canterbury. Under Policy WQL2(2), land discharge of treated sewage effluent is the preferred method for disposal of this waste. The term 'best practicable option', which is defined in section 2 of the RMA, will require a number of interrelated matters such as the current state of technical knowledge, costs, nature of the discharge and sensitivity of the receiving environment to be assessed when considering an application for a discharge permit.[202] Sewerage networks and community treatment plants should be designed and operated to prevent overflows into surface water as far is as practicable. Contingency planning and system design should provide for temporary storage, and back up systems for pumps and power supplies in the event of maintenance, system failure, or a natural event.

Policy WQL2(3) recognises that there may be some circumstances, where the discharge of treated human sewage effluent onto land is not practicable and a discharge into surface water may be the only option. ~~In such cases, it is expected that the effluent would be treated to the highest practicable levels and meet the requirements of Policy WQL1~~In such cases, it will be necessary to show that alternative forms of disposal are not feasible, because of the state or sensitivity of the receiving environment, or for financial or technical reasons it is not the most efficient and effective means of managing the sewage effluent, and that the discharge can me the criteria in Policy WQL2(3)(b)[203].

Hazardous substances are, by their nature, dangerous to people, and the aquatic environment. However, there will be situations where hazardous substances may need to be used in or adjacent to a water body. For example, pesticides are often the only practical method of controlling the spread of pest plant and animal species. The purpose of Policy WQL2(4) is to allow the use of certain hazardous substances but subject to certain restrictions. The control of pest species includes an investigation of measures to eliminate or contain a particular species.[204] Where hazardous substances are to be used in the vicinity of surface water, all practicable steps should be taken to avoid any significant contamination of the water body. If these measures are adopted, the potential for adverse effects caused by the use of hazardous substances will be substantially reduced.

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[202] **WQL2.130**

[203] **WQL2.134**

[204] **WQL2.136**

Policy WQL2(5) recognises that hazardous substances may be released during their normal use, or as a result of a natural event, such as inundation, or ground movement as a result of an earthquake. The location of some types of natural events can be identified and the risk that a discharge of hazardous substances entering into a river or lake can be avoided by not locating hazardous facilities in these areas. Permanent ground deformation occurs when the land surface is displaced or warped as a result of movement on a fault line. For other types of natural events that have widespread effects, and to prevent accidental discharges from day-to-day use of these substances, or the discharge of hazardous substances during an emergency, (e.g. use of chemicals for fire-fighting)[205], the hazardous facility should implement the best accepted national, or where appropriate, international standards or methods of design and operation to prevent a release of a hazardous substance either directly or indirectly to surface water.

This policy is consistent with, and gives effect to, Policy 12, Chapter 9, and Policies 1 and 3, Chapter 17, of the Canterbury Regional Policy Statement. Policy 1, Chapter 17 sets out the respective responsibilities of Environment Canterbury and territorial authorities relating to the storage, use, transportation, disposal and discharge of hazardous substances in the region.

Methods

The methods used or to be used to implement Policy WQL2 are:

Method WQL2(a) Advocacy

Environment Canterbury will advocate to a territorial authority or a network utility operator, with responsibility for a reticulated network that conveys waste or a hazardous substance, to prepare and implement a management plan to:

(i) assess, monitor and maintain the network to prevent the leakage of contaminants to surface water; and

(ii) provide adequate storage of contaminants in the event of system failure and to minimise overflows to surface water from pipeline networks resulting from inflows of surface water or groundwater into the network; and

(iii) prepare contingency plans and implement measures to minimise adverse effects on surface water quality from waste or hazardous substances escaping the network.

[205] **WQL2.136**

Method WQL2(b) Information and promotion

Environment Canterbury will:

(a) promote adherence to the ~~*Code of Practice for the Management of Agrichemicals* (~~NZS 8409:~~1999~~ 2004 Management of Agrichemicals[206] or subsequent versions~~)~~ through resource care groups, and other community groups.

(b) promote the correct use, storage application, and disposal of agrichemicals, including the use of national training and accreditation programmes, such as GROWSAFE® training programmes, the "Registered Chemical Applicators Scheme", 'New Zealand Agricultural Aviation Association's Accreditation for aerial application', or equivalent qualification from a recognised training body,[207] such as the New Zealand Agrichemical Education Trust.

(c) in consultation with, territorial authorities, industry organisations, landcare groups, and landowners, prepare and distribute information on:

  (i) the safe storage, handling and use of hazardous substances;

  (ii) appropriate methods for collecting and applying animal effluent to land;

  (iii) contingency plans to avoid discharges to water from utility network systems;

  (iv) best practices for design and management of raceways, hardstanding areas and feedpads for livestock.

(d) promote the use by industry of environmental management tools, such as the "*Pollution Prevention Guide*"[208], "*Liquid and Hazardous Waste Code of Practice*"[209] to reduce the risk of accidental discharges of hazardous substances.

(e) provide information on areas subject to natural hazards including fault zones, flood channels and flood hazard zones.

(f) promote the use of the *Australian and New Zealand Standard 4452:1997-The storage and handling of toxic substances*, or subsequent versions, and any regulations made under the Hazardous Substances and New Organisms Act 1996.

(g) promote the use of cleaner production practices, including the use, production and storage of hazardous substances, especially toxic, persistent, and bio-accumulative substances.

(h) promote the adoption and use of the *'Industry Code of Practice for the Minimisation of Stock Effluent Spillage from Trucks on Roads'* (1999), or subsequent versions of the Code.

(i) promote the adoption by territorial local authorities of the *Hazardous Facilities Screening Procedure*[210] as a method for managing hazardous substances.

Methods of information transfer include; field days, workshops, demonstration sites, media items, Environment Canterbury's website, reports, fact sheets, and site auditing.

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[206] WQL1.32

[207] WQL2.147

[208] *Pollution Prevention Guide*. Environment Canterbury published report no. R03/4, June 2003. 85 pp.

[209] *Liquid and Hazardous Waste Code of Practice* Published by New Zealand Water and Wastes Association, 2003. 317pp

[210] *Land Use Planning Guide for Hazardous Facilities.* Ministry for the Environment report no. 424, February 2002, 206 pp.

Method WQL2(c) Investigations

Environment Canterbury in consultation with territorial authorities, will, where appropriate, identify the location of hazardous substance storage facilities and pipelines in the region and assess the risk of contamination to surface water from damage to these structures in extreme natural events.

Method WQL2(d) Contingency planning and emergency response

Environment Canterbury will work with other parties, such as Transit NZ, TranzRail, Ngāi Tahu, territorial authorities, the New Zealand Fire Service, the Medical Officer of Health,[211] industry associations, and companies to develop appropriate measures or strategies to:

(a) ensure the safe transport of hazardous substances and wastes by road and rail.

(b) avoid the contamination of surface water from accidents or spills, and to develop contingency plans for dealing with spills.

(c) provide technical assistance to emergency services dealing with unplanned discharges of hazardous substances.

(d) minimise the discharge of animal effluent from stock trucks onto the region's roads.

(e) dispose of milk to minimise impacts on water quality and public health in the event of disruption to processing facilities, or transport networks.

(f) collect, store and dispose in an appropriate manner, hazardous substances which have been accidentally discharged as a result of a natural hazard event.

Method WQL2(e) Response to complaints and enquiries

Environment Canterbury will:

(a) provide a 24-hour capability to respond to any complaints or incidents of unauthorised discharges of sewage, solid and hazardous waste or other hazardous substances to surface water.

(b) maintain a database to record the details of any complaints or incidents of unauthorised discharges to surface water and the response by Environment Canterbury.

Method WQL2(f) Regional rules

Environment Canterbury will apply Regional Rules WQL 7, WQL9; WQL11; WQL12; WQL13; WQL14, WQL15, WQL16, WQL26; WQL27; WQL28, WQL29; WQL30; WQL42; WQL43; WQL44; WQL45;WQL46, WQL47; WQL55; WQL62; WQL63 in Section 4.6 to give effect to Policy WQL2.

Method WQL2(g) Resource consents

Discharge permits may be granted for treated community sewage discharges to water provided the adverse effects are minor.

Conditions on a resource consent may also require:

(a) a financial contribution be made by the consent holder to mitigate or remedy the adverse effects of any point source discharge on a water body; or

(b) a bond be imposed on the consent holder to ensure compliance with conditions on a resource consent.

Land use consents may be granted for the storage, use, disposal or transportation through a pipe of certain classes of hazardous substances. Conditions will be imposed to ensure that any adverse effects of hazardous substance discharges on the quality of water or the aquatic environment are prevented or mitigated.

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[211] **WQL2.149**

When considering the duration of any resource consent, Environment Canterbury will set the duration of the resource consent for as long as is consistent with the purpose of the RMA, and shall have particular regard to the matters set out in Section 1.3.5 and to the guidelines for consent duration set out in Sections 4.8 and 4.9. [212]

Method WQL2(h) Compliance monitoring and enforcement

Environment Canterbury will monitor and enforce compliance with the conditions of permitted activities and of any resource consent it has granted. Environment Canterbury may apply for enforcement orders, issue abatement notices and infringement notices, and use other enforcement mechanisms in Part 12 of the RMA, to enforce the rules of Chapter 4, or a breach of resource consent conditions.

An enforcement order or abatement notice can require a person to do something that is necessary in order to avoid, remedy, or mitigate any actual or likely adverse effect on the environment caused, by, or on behalf of that person.

Method WQL2(i) Territorial authorities

Territorial authorities shall give effect to this policy as follows:

(a) develop objectives, policies and rules in their district plan, and in the exercise of their functions under their district plan, control the use of land to prevent or mitigate adverse effects on water quality from the storage, use, disposal or transport of hazardous substances that:

  (i) are not listed in Policy 1(a)(ii) of Chapter 17 of the Canterbury Regional Policy Statement; and

  (ii) are listed in Policy 1(a)(ii) of Chapter 17 of the Canterbury Regional Policy Statement and are transported by means other than through a pipe.

These provisions shall include the following requirements:

  (1) a hazardous facility including a pipeline used to transport a hazardous substance,[213] should not be located where there is a significant risk that the facility or pipeline could be flooded, affected by subsidence or slippage of land, or disrupted as a result of movement on an active fault line; and there is a practical possibility of a hazardous substance entering a river, or lake; and

  (2) best practices are used in the design, construction and use of a hazardous facility, including a pipeline used to transport a hazardous substance,[214] to prevent a discharge entering a stormwater system or entering surface water as a result of; routine use of a hazardous substance, leakage from a facility or pipeline, or seismic activity that is likely to result in structural damage from ground motion or liquefaction.

(b) by implementing their responsibilities under the *Canterbury Hazardous Waste Management Strategy*[215].

Policy WQL3 Minor point source discharge to surface water

Allow as a permitted activity, the discharge of a contaminant or water from a point source to surface water , or to land where it may enter surface water provided ~~where the discharge will~~:

(1) the following criteria are met:

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[212] **GEN1.102**

[213] **WQL2.142**

[214] **WQL2.142**

[215] *Canterbury Hazardous Waste Management Strategy*. Environment Canterbury, May 2001. 51 pp

(a) the concentration of any contaminant or the volume of water in the discharge will have no more than a minor adverse effect on water quality, the river or lake bed substrate or instream values of the receiving water body;

(b) the discharge will not result in the accumulation, above the natural concentration in the aquatic ecosystem or sediment of the bed, of a persistent or toxic contaminant; and[216]

(c) any change to the flow of a river will not:

(i) cause a significant increase in the risk in flooding to land or a dwelling;

(ii) cause a significant increase in the erosion rate of the bed or banks; and

(iii) increase by more than one per cent, the flow of a flood event with an Annual Exceedance Probability of 20 per cent; and[217]

~~(1)~~ (2) The discharge will not result, outside the specified[218] **Zone of Non-Compliance, in any of the following adverse effects:**

(a) the production of conspicuous oil or grease films, scums or foams, or suspended materials; or

(b) any conspicuous change in the colour or significant decrease in the clarity of the water; or

(c) any emission of objectionable odour; or

(d) the rendering of fresh water unsuitable for consumption by farm animals; or

(e) any significant adverse effects on the growth, reproduction and movement of aquatic life.

~~(2)~~ (3) A discharge must[219] **meet the water quality standard for the receiving water at the point of discharge if it occurs within one kilometre upstream in a river, or within a one kilometre radius on a lake, from an intake for a community drinking water supply;**

~~(3) not result in more than minor adverse effects on Ngāi Tahu values for the water body; and~~[220]

~~(4) not cause more than a minor change to the flow regime of a river.~~[221]

Explanation and principal reasons

Some point source discharges have minor or negligible impacts on the river or lake ecosystem and instream values. The purpose of this policy is to set criteria for authorising discharges to surface water as permitted activities. In the absence of a regional rule, these activities would require a resource consent. These discharges, provided they meet certain conditions and mixing with the receiving water occurs within a specified distance from the discharge point, should not cause any of the effects identified in this policy or Policy WQL 1 or Section 70 of the RMA. There is little justification for requiring a resource consent for an activity that has little or no adverse effect on water quality.

[216] **WQL2.157**

[217] **WQL2.172**

[218] **WQL2.157**

[219] **WQL2.157**

[220] **WQL2.171**

[221] **WQL2.172**

Policy WQL5: Management of riparian ~~margins~~ zones[232]

(1) Maintain or improve water quality, the quality of river bed substrate, ~~or~~ and aquatic habitats in a river, ~~or~~ lake, wetland or artificial watercourse by:

(a) ensuring activities that disturb or deposit soil or vegetation ~~on~~ in the ~~margin~~ riparian zone[233] of a river, ~~or~~ lake, or wetland[234] are undertaken in ways that minimise:

(i) ~~minimise~~ the discharge of sediment into water; ~~or~~ and

(ii) ~~do not increase the rate of erosion~~ the risk of induced erosion [235]of the bed or banks of the water body.

(b) promoting the retention, maintenance ~~retaining, maintaining~~[236], or planting riparian vegetation that effectively:

(i) minimises the supply of sediment from bank erosion;

(ii) reduces the concentration of nutrients, sediment and animal faecal matter in overland flow from adjacent land; and

(iii) shades water and controls the excessive growth of macrophytes or algae, or limits large fluctuations in the daily water temperature.

(2) When giving effect to Policy WQL5[237](1)(b), the retention, maintenance or planting of riparian vegetation should, as far as practicable:

(a) contribute to the indigenous biodiversity of the area, particularly plant communities that are threatened or under-represented;

(b) provide for a diversity of habitats for indigenous fauna, in particular the spawning habitat for indigenous fish species[238];

(c) improve or establish connections between riparian plant communities which create corridors for wildlife dispersal;

(d) not reduce the flood carrying capacity of a river, or cause adverse effects on the stability or performance of essential structures;

(e) avoid the establishment of pest plant and animal species, and implement measures to control the spread of pest species;

(f) not impede existing public access to or along a river or lake;

(g) not impede existing access ~~for the maintenance of drains~~ to, or give rise to any adverse effects on, existing network utility infrastructure;[239] and

(h) take into account the effects of a change from short to tall vegetation on the flow regime in a catchment identified in Chapter 5, Appendix WQN4. Where there is a conflict between the effects of vegetation on the flow regime and the need to retain or plant vegetation for water quality purposes, an assessment should be made of the relative costs and benefits of using tall vegetation for these purposes.

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[232] **GEN2.14**

[233] **GEN2.14**

[234] **WQL2.182**

[235] **WQL2.187**

[236] **WQL2.189**

[237] **WQL2.191**

Explanation and principal reasons

Riparian vegetation can play a significant role in maintaining or improving water quality by stabilising the banks against stream erosion, filtering and trapping the overland flow of particles of sediment, phosphorus and faecal matter from nearby land. Dissolved nutrient concentrations in surface water and groundwater are reduced as the water moves through the riparian zone, by biochemical processes and uptake by plants. Tall or overhanging vegetation shades water from direct sunlight, reducing water temperature fluctuations which may harm aquatic organisms, and preventing excessive plant growth. It also creates cover for fish, and a habitat for some species of birds and insects. Terrestrial insects that fall off vegetation into water provide a source of food for aquatic fauna. Leaf litter and other organic debris, provide a food source and instream habitat for the aquatic ecosystem.

Riparian ~~margins~~ zones[240], as the boundary between terrestrial and aquatic ecosystems, may also facilitate the movement of species within a catchment, particularly between fragmented areas of terrestrial habitat, between land and water, and from high to low altitudes. They also provide streamside habitat which is important for maintaining instream values and for associated species, such as bats, birds, lizards and insects that are an important component of the stream environment.

Water bodies are particularly vulnerable to the adverse effects of land use activities which disturb or deposit soil or remove vegetation in the riparian ~~margin~~ zone[241]. Because these activities occur close to the edge of a water body sediment or vegetation may be directly deposited into the bed or washed in by overland flow during periods of rainfall. There are well-established techniques which can be easily applied to minimise sediment runoff from areas of disturbed soil and to prevent vegetation entering water bodies. As a number of Canterbury's indigenous fish species are classified as rare or threatened, riparian vegetation that provides habitat for these species should be maintained or restored where possible.[242]

The primary purpose of the policy is to promote riparian planting for water quality reasons, whether by using indigenous or exotic species. However, indigenous species can perform the same role as exotic species, the policy expresses a preference for using indigenous species as this helps restore indigenous biodiversity values that have been lost or diminished in many areas.

The re-establishment of riparian vegetation may not result in an immediate improvement in water quality, and there may be short-term changes or even decline in water quality as river channels adjust to the new conditions.

Extensive plantings of tall vegetation can have an impact on flows by interception and transpiration of water. Where the use of tall vegetation for managing water quality is likely to conflict or have adverse effects on other management outcomes, such as the maintenance of flows or reliability of supply to other users, a specific investigation should be undertaken to guide a decision whether to proceed with planting of tall vegetation.

While the principal purpose of this Policy is to provide general guidance on the management and re-establishment of riparian vegetation to protect water quality, it also provides for riparian vegetation to be managed for other values in accordance with the Canterbury Regional Policy Statement. Environment Canterbury and territorial authorities have differing but overlapping responsibilities for managing land uses within riparian ~~margins~~ zones[243]. For water quality matters, where Environment Canterbury has primary responsibility, the

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[238] **WQL2.191**

[239] **WQL2.191**

[240] **GEN2.14**

[241] **GEN2.14**

[242] **WQL2.197**

[243] **GEN2.14**

provisions of district plans cannot be inconsistent with the regional plan. However, because there are shared responsibilities between local authorities, procedures need to be put in place to co-ordinate administrative and regulatory processes between Environment Canterbury and territorial authorities.

Methods

The methods used or to be used to implement Policy WQL5 are:

Method WQL5(a) Advocacy

Environment Canterbury will advocate to:

(a) the Commissioner of Crown Lands or their agent, and the Department of Conservation during tenure review of pastoral leases or sale of Crown land, that marginal strips be established under Part 4A, Section 24 of [244] the Conservation Act along the margins or rivers and lakes to maintain water quality and aquatic life.

(b) territorial authorities to include provisions in their district plans to create, at the time of subdivision of any land adjacent to a river or lake, esplanade reserves or esplanade strips, in accordance with s230 of the RMA, to retain or restore riparian vegetation for the purpose of maintaining or enhancing water quality or aquatic habitats.

Environment Canterbury will provide information regarding priority water bodies for protection and optimal buffer widths for the maintenance or enhancement of water quality and aquatic habitats.[245]

Method WQL5(b) Information and promotion

Environment Canterbury will:

(a) work with land owners, territorial authorities, Queen Elizabeth II Trust, Department of Conservation, Te Rūnanga o Ngāi Tahu, Nga Rūnanga, and other organisations on measures to support and promote good riparian management.

(b) support and encourage community groups and other organisations to "adopt a stream" and undertake restoration and planting of the ~~margins~~ riparian zone[246].

(c) implement ways of reducing the cost of riparian management by such measures as co-ordinating with landowners, community groups, and other organisations the bulk purchase of plants and materials.

Method WQL5(c) Riparian Management Strategy

Environment Canterbury, in consultation with territorial authorities, Te Rūnanga o Ngāi Tahu, Nga Rūnanga, Department of Conservation, landholders, industry and community groups, will prepare a riparian management strategy to provide a framework for managing areas along streams and lakes in the Canterbury region, and to rank areas for protection and restoration.

Specific matters to be included in the strategy are:

(a) a system for classifying riparian ~~areas~~ zones[247] in the Canterbury region and identifying their riparian values and functions;

(b) an economic analysis of the costs and benefits of undertaking a range of riparian management options in the region;

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[244] **WQL2.199**

[245] **WQL2.208**

[246] **GEN2.14**

[247] **GEN2.14**

(c) the establishment of partnerships with territorial authorities, adjacent regional councils where there is a need for cross-boundary management, and with other agencies and landholders to achieve effective riparian management;

(d) the establishment of priorities for restoration or protection of riparian ~~margins~~ zones[248], including land managed by Environment Canterbury; and

(e) guidelines for the management of riparian ~~areas~~ zones[249], including planting and maintenance of riparian vegetation, optimal widths to protect water quality and aquatic ecosystems, [250]control of plant and animal pests, and land management practices, such as appropriate plant species, planting methods, fencing, stock management, and maintenance techniques.

Method WQL5(d) Land under the management of Environment Canterbury

Environment Canterbury will prepare a strategy for land it owns or administers that incorporates best management practices to achieve the objectives and implement the policies of this plan. Environment Canterbury will implement these practices in the management of this land, where it is adjacent to surface water bodies, to maintain or improve riparian vegetation, water quality and aquatic ecosystems.

Method WQL5(e) Environment Enhancement Fund

Environment Canterbury will maintain a fund for environmental enhancement through this fund may contribute towards the costs of individuals and community groups implementing measures to protect and enhance waterways, indigenous plants or animals and their habitats. Full details of this fund and how to apply are available upon request from Environment Canterbury or from the Council's website, www.ecan.govt.nz.

Method WQL5(f) Response to complaints and enquiries

Environment Canterbury will:

(a) provide a 24-hour capability to respond to any complaints or incidents of activities in riparian ~~margins~~ zones[251] that do not comply with the conditions of the permitted activity rules or resource consents.

(b) maintain a database to record the details of any complaints or incidents of activities in riparian ~~margins~~ zones[252] and the response by Environment Canterbury.

Method WQL5 (g) Regional rules

Environment Canterbury will apply Regional Rules WQL32, WQL33, and WQL34 in Section 4.6 to give effect to Policy WQL5.

Method WQL5 (h) Resource consents

Where an activity cannot satisfy the conditions of the permitted activity rule, a resource consent will be required. A consent may or may not be granted. Matters that will be considered include the potential adverse effects on the water body and the measures that will be undertaken to avoid, remedy or mitigate these effects.

Conditions on a resource consent may also require:

(a) a financial contribution be made by the consent holder to mitigate or remedy the adverse effects of the land use activity on a water body; or

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[248] **GEN2.14**

[249] **GEN2.14**

[250] **WQL2.179**

[251] **GEN2.14**

[252] **GEN2.14**

(b) a bond be imposed on the consent holder to ensure compliance with conditions on a resource consent.

(c) works in a riparian zone that may mitigate or remedy the adverse effects of the land use activity on a water body.[253]

When considering the duration of any resource consent, Environment Canterbury will set the duration of the resource consent for as long as is consistent with the purpose of the RMA, and shall have particular regard to the matters set out in Section 1.3.5 and to the guidelines for consent duration set out in Sections 4.8 and 4.9.[254]

Method WQL5(i) Compliance monitoring and enforcement

Environment Canterbury will monitor and enforce compliance with the conditions of permitted activities and of any resource consent it has granted. Environment Canterbury may apply for enforcement orders, issue abatement notices and infringement notices, and use other enforcement mechanisms in Part 12 of the RMA, to enforce the rules of Chapter 4, or a breach of resource consent conditions.

An enforcement order or abatement notice can require a person to do something that is necessary in order to avoid, remedy, or mitigate any actual or likely adverse effect on the environment caused, by, or on behalf of that person.

Method WQL5(j) Territorial authorities

Territorial authorities ~~shall~~ should, in the preparation, variation, change or review of their district plans, establish provisions which ensure that at the time of subdivision of any land adjacent to a river or lake, esplanade reserves or esplanade strips are created in accordance with s.230 of the RMA to retain and enhance riparian vegetation ~~for the purpose of~~ where this will contribute to the maintenance~~aining~~ or enhancement~~ing~~ of [255]water quality or aquatic habitats.

[253] **WQL2.206**

[254] **GEN1.102**

[255] **WQL2.208**

Rule WQL1 Point source discharge of water or a contaminant into a surface water body, or onto land which may result in water or a contaminant entering a surface water body - permitted activity

Activity	Conditions	Cross reference
The point source discharge of water or a contaminant into a surface water body or onto land which may result in a contaminant or water entering a surface water body is a **permitted activity** if the discharge complies with all of the conditions of this Rule, except where it is: (a) a **permitted activity** under Rules WQL 3, WQL6, WQL16, WQL 17, WQL 20, WQL49, WTL 2(a) or WTL 2(b) in which case the provisions of those rules apply; or (b) a **controlled activity** under Rules WQL4 or WQL7; or (c) a **restricted discretionary activity** under Rule WQL21 (d) a **discretionary activity** under Rule WQL 56; or (e) a **non complying activity** under Rules WQL14, or WQL 60; or (f) a **prohibited activity** under Rules WQL15, WQL22, WQL28, or WQL 46. A discharge which does not comply with: 1. Any one or more of Conditions 1 to 6 and 8 to 11 is a **discretionary activity**, requiring a resource consent under Rule WQL 56; or 2. Condition 7 is a **non-complying activity**, requiring a resource consent under Rule WQL 60. **Where rule applies** This rule does not apply to all areas/ situations in the Canterbury	1. The specific conductance (conductivity measured at 25 degrees Celsius) of the discharge shall not exceed 40 millisiemens per metre. 2. The rate of flow in the receiving water at the point and time of discharge shall be at least five times the rate of the discharge. 3. The concentration of chlorine in the discharge shall not exceed 0.5 gram per cubic metre. 4. The concentration of hydrogen sulphide in the discharge shall not exceed 0.1 gram per cubic metre. 5. The discharge shall not result in: (a) an increase in the embeddedness of the riverbed substrate by more than 20 percent; or (b) an increase in the flow in the receiving water body at the point of discharge by more than one percent of a flood event with an Annual Exceedance Probability of 20 percent (one in five year event); or (c) a significant increase in flooding of a dwelling or land; or (d) a significant increase in the erosion rate of the bed or banks of the receiving water body. 6. For areas other than those identified in Condition 8, the discharge shall not, outside of the Zone of Non-Compliance: (a) change the colour by more than five Munsell units; (b) decrease the clarity by more than 20 percent; (c) change the pH by more than 1.0 pH unit; (d) change the temperature of a river or artificial water course by more than three degrees Celsius ; (e) change the temperature of a lake by more than one degree Celsius; (f) produce conspicuous oil or grease films, scums or foams; (g) produce any objectionable odour; (h) cause any significant adverse effects on aquatic life; or (i) ~~render fresh water unsuitable for consumption by farm animals.~~ cause the concentration *of Escherichia coli* to exceed 550 *E. coli* per 100 millilitres.[289]	**Policies** WQL 3 WQL12

[289] **WQL2.168**

region – see Table WQL 7: Index of rules	7. For the purposes of this rule, the Zone of Non-Compliance means the receiving water in: (a) a reach of a river or an artificial water course measured from the point of discharge for a distance *L* (length in metres) calculated using the following formula: $$L = \left(\sqrt{W}\right) \times 25$$ Where *W* is the width of the flow measured in metres at the point of discharge; or (b) 20 metres from the point of discharge into a lake. 8. Where the discharge is within any of the following areas: (a) within one kilometre upstream on a river, or within one kilometre on a lake, from an intake for a community drinking water supply listed in Schedule WQL2; ~~or~~ (b) ~~a river identified in Table WQN17 of Schedule WQN 5; or~~ (c) ~~a significant spawning reach for salmon listed in Schedule WQN14~~[290]; the discharge shall meet the water quality standards for the receiving water as set out in Schedule WQL1 at the point of discharge and there shall be no Zone of Non-Compliance. 9. A discharge of land drainage water shall: (a) only be from a drainage system which existed at the time of notification of this rule; and (b) not be from a wetland unless the drainage of the wetland is authorised as a permitted activity by the rules of Chapter 7 of this plan; and (c) flow by gravity only. 10. The duration of the discharge shall not exceed three days in any consecutive six month period, except for a land drainage discharge or a site de-watering discharge, which may be continuous. 11. The discharge shall not occur into a wetland: (a) classified as moderate significance or higher in *Schedule WTL1: Moderate and higher significance wetlands*; or (b) that has not been classified in accordance with the protocol defined in Appendix WTL B. 12. A discharge of water that commences for the first time after the date of notification of this rule shall only be of water sourced from the same river catchment in which the discharge occurs.	

[290] **WQL2.106**

Rule WQL3 Discharge of pool water or filter backwash water containing contaminants into a river or artificial water course, or pool water containing contaminants onto or into land- permitted activity

Activity	Conditions	Cross reference .
The discharge of: (a) swimming pool or spa pool water, containing contaminants into a river or an artificial water course; or (b) swimming pool, spa pool water, or pool filter backwash water, containing contaminants onto or into land; is - 1. a **permitted activity** if the discharge is: (a) swimming pool or spa pool water into a river or an artificial water course, and the discharge complies with Conditions 1 to 8 of this Rule; or (b) pool filter backwash water onto or into land and the discharge complies with Condition 9 of this Rule; or (c) swimming pool or spa pool water onto land and the discharge complies with Condition 10 of this Rule. 2. a **discretionary activity** if the discharge does not comply with any one or more of the conditions of this Rule, in which case a resource consent under either Rules WQL 56 or WQL 57 is required.	1. For areas other than those identified in Condition (8), the discharge of pool water into a river, or an artificial watercourse, outside of the Zone of Non-Compliance, shall not: (i) change the colour by more than five Munsell Units; (ii) decrease the clarity by more than 20 percent; (iii) increase the temperature by more than three degrees Celsius; For the purposes of this Condition, the Zone of Non-Compliance means the receiving water in a reach of a river or an artificial water course measured from the point of discharge for a distance *L* (length in metres) calculated using the following formula: $$L = \left(\sqrt{W}\right) \times 25$$ Where *W* is the width of the flow measured in metres at the point of discharge. 2. The temperature of the discharge shall not exceed the temperature of the receiving water by more than ten degrees Celsius. 3. The rate of flow in the receiving water shall be at least five times the rate of discharge; 4. There shall be no copper sulphate or other copper salts, or aluminium sulphate or other aluminium salts or other flocculants in the discharge. 5. The discharge shall be through an outlet with a diameter not larger than 50 millimetres and the rate of discharge shall not exceed 2.7 litres per second. 6. The concentrations of the following chemicals in the discharge shall not exceed the following values: **Chemical** — **Concentration** (grams per cubic metre) Residual (free-available) chlorine — 0.5 Residual bromine — 0.5 Baquacil™ — 10.0 Isocyanurates — 30.0	**Policies** WQL3 WQL7 WQL8 WQL12

[291] **WQL2.106**

Where rule applies This rule does not apply to all areas/ situations in the Canterbury region – see Table WQL 7: Index of rules	Sodium Chloride 3500.0 7. There shall be no discharge of swimming pool or spa pool water within 14 days of a pool being dosed with a proprietary pool sanitizing agent containing chlorine, bromine, or Baquacil™. 8. Where the discharge of pool water is to a river within any of the following areas: (a) within one kilometre upstream on a river, from an intake for a community drinking water supply listed in Schedule WQL2; ~~or~~ (b) ~~a river identified in Table WQN17 of Schedule WQN 5; or~~ (c) ~~a significant spawning reach for salmon listed in Schedule WQN14;~~[291] the discharge shall meet the water quality standards for the receiving water as set out in Schedule WQL1 at the point of discharge and there shall be no Zone of Non-Compliance. 9. The discharge of pool filter backwash water onto or into land shall not occur where: (a) a connection to a sewerage network is available. For the purpose of this condition, "available" means the property where the pool is located: (i) is connected to a sewerage network; or (ii) within 30 metres of a sewerage pipeline network and the network operator will accept the discharge; (b) the point of discharge is within 20 metres of any surface water body or drinking water supply bore; (c) the discharge may enter any surface water body, including via a stormwater network system; or (d) the land is located over in an unconfined or semi-confined aquifer, where the highest groundwater level, which can reasonably be expected at the point of discharge based upon relevant and available groundwater data, is deeper than 30 metres from the ground surface. 10. The discharge of swimming or spa pool water onto land shall not occur where it may; (a) flow into; (i) any wetland listed in *Schedule WTL1: Moderate and higher significance wetlands*; or (ii) any other wetland unless the taking, use, damming or diversion of water is permitted under Rule WTL2 or Rule WTL3; or (b) flow or percolate onto any other property, except with the written permission of the current owner of that property.	

Rule WQL6 Discharge of stormwater containing contaminants into a river, lake or artificial watercourse - permitted activity

Activity	Conditions	Cross reference
The discharge of stormwater containing contaminants into: (a) a river, lake or artificial watercourse; or (b) onto land where it may enter a river, lake or artificial watercourse; is – 1. a **permitted activity** if the discharge complies with all of the conditions of this Rule; 2. a **controlled activity** if the discharge does not comply with Condition 3 of this Rule, in which case a resource consent under Rule WQL 7 is required; 3. a **discretionary activity** if the discharge does not comply with any one or more of Conditions 1, 2, or 4 to 10 of this Rule, in which case a resource consent under Rule WQL 56 is required; 4. a **non-complying activity** if the discharge does not comply with Condition 11 of this Rule, in which case a resource consent under Rule WQL 60 is required. For the purposes of this rule: (i) "stormwater management area" means: (1) a settlement; or (2) a watershed catchment of a river named on New Zealand Map Series 260 1:50,000 scale, or a tributary of that river upstream of the confluence of the tributary and any other river where 30 percent or more of the catchment is identified in a district plan for residential, commercial or industrial activities, or any combination of these activities; (ii) "settlement" means an existing or proposed collection of residences or workplaces, or any combination of these activities, with a population of 200 or more people. This	1. There is no pipeline network available for the collection of the stormwater. For the purpose of this condition, "available" means: (a) a stormwater network system passes within 30 metres of the property boundary; and (b) the stormwater can flow into the network under gravity; and (c) the network operator will accept the discharge. 2. The discharge shall not be from a site where an activity listed in Schedule WQL3 is occurring. 3. The discharge shall not be from a site in a stormwater management area or from a network servicing a stormwater management area after the date Regional Rule WQL 7 becomes operative. 4. There shall be no discharge into: (a) a water race, as defined in Section 5 of the Local Government Act 2002; or (b) a wetland; (i) listed in *Schedule WTL1: Moderate and higher significance wetlands*; or (ii) a wetland unless the taking, use, damming or diversion of water is permitted under Rule WTL2 or Rule WTL3. 5. The discharge shall be via a treatment system that removes at least 75 percent of total suspended solids where the discharge is from: (a) a new or proposed stormwater collection system with a collection area of between 500 square metres and two hectares in Zone BP in Map Volume – Part 1 Planning Maps; or (b) an area disturbed for construction activities and the bare ground is not revegetated or protected from soil erosion within three months from commencement of the works exceeding: (i) 1000 square metres located in Zone BP in Map Volume – Part 1 Planning Maps; or (ii) 5,000 square metres elsewhere in the region; or (c) a new or proposed stormwater collection system with a collection area of between two and four hectares in all other areas of the region. 6. The treatment system for any discharge authorised under Condition (5), shall be certified by a person suitably qualified and competent in treatment systems, that the system is capable of meeting the treatment standard specified in Condition (5), and a copy of the certificate forwarded to Environment Canterbury within thirty working days following the installation of the treatment system. 7. Except for areas specified in Condition (11), a discharge into a river or lake shall, outside of the Zone of Non-Compliance, meet the water quality standards for the receiving water as set out in Schedule	**Policies** WQL3 WQL12

[293] **WQL2.106**

includes any proposed settlement or extension to an existing settlement. **Where rule applies** This rule does not apply to all areas/ situations in the Canterbury region – see Table WQL 7: Index of rules	WQL1. For the purposes of this Condition , the Zone of Non-Compliance means the receiving water: (a) in a reach of a river or an artificial water course measured from the point of discharge for a distance *L* (length in metres) calculated using the following formula: $$L = \left(\sqrt{W}\right) \times 25$$ where *W* is the width of the flow measured in metres at the point of discharge; or (b) 20 metres from the point of discharge into a lake. 8. The discharge shall not result in: (a) an increase in the embeddedness of the riverbed substrate by more than 20 percent; or (b) an increase in the flow in the receiving water body at the point of discharge of more than one percent of a flood event with an Annual Exceedance Probability of 20 percent (one in five year event). 9. The discharge from a roof shall be via a system that prevents the entry of surface runoff into the stormwater system. 10. The discharge of stormwater from an electricity substation area, where oil filled equipment is located, shall only be made to surface water, where: (a) a connection to a sewerage network is not available, and (b) the electricity substation area is enclosed within an impervious bunded area, or designed to contain all spillages, or is encircled by interceptor drains, and drains to an oil interceptor of a type and size which gives a concentration of oil and grease not exceeding 15 grams per cubic metre in the discharge as measured by American Society for Testing and Materials (ASTM) Method D4281, or American Public Health Association (APHA) 5520B, and can retain the capacity of the largest container of oil on the site plus 10 percent of that volume; and (c) a copy of all maintenance records for the stormwater and oil containment systems shall be made available to Environment Canterbury upon request. 11. Where the discharge is to a river, lake, or artificial water course within any of the following areas, the discharge shall meet the water quality standards for the receiving water as set out in Schedule WQL1 at the point of discharge and there shall be no Zone of Non-Compliance: (a) within one kilometre upstream on a river, or within one kilometre on a lake, from an intake for a community drinking water supply listed in Schedule WQL2; ~~or~~ (b) ~~a significant spawning reach for salmon listed in Schedule WQN14.;~~ [293]	

Rule WQL7 Discharge of stormwater containing contaminants onto or into land or into a river, lake or artificial watercourse from a stormwater management area- controlled activity

Activity	Conditions	Matters for Control	Cross reference
The discharge of stormwater: (a) onto or into land; or (b) into a river, lake or artificial watercourse; from a stormwater management area; is – 1. a **controlled activity** if the discharge complies with all of the conditions of this Rule; 2. a **discretionary activity** if the discharge does not comply with any one or more of Conditions 1 to 3 of this Rule, in which case a resource consent under either Rules WQL 56 or WQL 57 is required; 3. a **discretionary activity** if the discharge does not comply with Condition 4 of this Rule, in which case a resource consent under Rule WQL 55 is required; 4. a **non-complying activity** if the discharge does not comply with Condition 5 of this Rule, in which case a resource consent under Rule WQL 60 is required. For the purposes of this rule: (i) "stormwater management area" means: (1) a settlement; or (2) a watershed catchment of a river named on New Zealand Map Series 260 1:50,000 scale, or a tributary of that river upstream of the confluence of the tributary and any other river where 30 percent or more of the catchment is identified in a district plan for residential, commercial or industrial	1. The area which is being serviced by the stormwater network shall be included in an integrated catchment management plan, which has been prepared in accordance with Section 4.7.3.2 of this Chapter, and any discharge shall comply the requirements of that plan. 2. Where the discharge is to a river or a lake in areas other than those identified in Condition (5), the discharge shall, outside of the Zone of Non-Compliance , meet the water quality standards for the receiving water as set out in Schedule WQL1. 3. A discharge to a river, lake or an artificial watercourse water shall not: (a) have a maximum total suspended sediment concentration of more than 125 percent of the maximum total suspended sediment concentration that occurred from the catchment before the land became a stormwater management area; or (b) increase the flow in the receiving water body by more than five percent of a flood event for that water body with an Annual Exceedance Probability of 20 percent (one in five year event). 4. There shall be no discharge in the areas identified as Zone 1A, Zone 1B, or Zone 1C of the Christchurch Groundwater Recharge Zone on Map Volume - Part 1 Planning Maps. 5. Where the discharge is to a river or a lake within any of the following areas: (a) within one kilometre upstream on a river, or within one kilometre on a lake, from an intake for a community	Environment Canterbury has reserved control over the following matters in imposing any conditions: 1. Rate and volume of discharge and the changes to the flow regime of a river, flood frequency, including flooding of land or dwellings, erosion of river bank and channels. 2. Concentration of contaminants and adverse effects, including cumulative effects on the receiving water quality of surface and groundwater, aquatic ecosystems, Ngāi Tahu values and other existing uses of the water, including takes and discharges. 3. Measures to: (a) avoid or minimise the entry of contaminants into stormwater; or (b) reduce the volume and concentration of contaminants in the discharge; or (c) minimise the volume of water in the discharge; or (d) ensure volume and rate of discharge do not exceed: (i) the capability of the soil and subsoil layers at the site to reduce contaminant	**Policies** WQL1 WQL2 WQL 6 WQL 8 WQL12

activities, or any combination of these activities; (ii) "settlement" means an existing or proposed collection of residences or workplaces, or any combination of these activities, with a population of 200 or more people. This includes any proposed settlement or extension to an existing settlement.	drinking water supply listed in Schedule WQL2; ~~or~~ (b) ~~a significant spawning reach for salmon listed in Schedule WQN14;~~[294] the discharge shall meet the water quality standards for the receiving water as set out in Schedule WQL1 at the point of discharge.	concentrations in the discharge; (ii) the infiltration capacity of the soil and subsoil layers at the site. (e) avoid the accumulation of toxic or persistent contaminants in the soil or subsoil layers. 4. Implementation of the integrated catchment management plan 5. Ensuring that the water quality standards for the receiving water will be observed out side of the Zone of Non-Compliance 6. The monitoring of the activity and its effects 7. The requirement for financial contributions, or bonds. 8. The duration of any consent granted. 9. The frequency and reasons to review consent conditions, including changes to the scale and intensity of activities	
Where rule applies This rule applies everywhere in the Canterbury region, excluding the Coastal marine area		**Service** In accordance with section 94D(3) RMA 1991, notice of an application for a resource consent required by this rule does not need to be served on those persons identified under Section 94(1) of that Act.	
Information to be provided An application for a resource consent under this rule must meet the information requirements set out in Section 1.3.4 and Section 4.7.			

[294] **WQL2.106**

Rule WQL56 Discharge of water or a contaminant into a river, lake or an artificial watercourse - discretionary activity

Activity	Conditions	Discretion	Cross reference
Except where it is: (a) **a permitted activity** under Rule WQL 1, Rule WQL3, Rule WQL 6, Rule WQL 16, Rule WQL 17; or Rule WQL20, WQL 49; WTL 2(a) or WTL 2(b); or (b) a **controlled activity** under Rule WQL 4 or Rule WQL 7; or (c) a **restricted discretionary activity** under Rule WQL21; or (d) a **discretionary activity** under Rules WQL 55 or WQL56; or (e) a **non-complying activity** under Rule WQL 14; or (f) a **prohibited activity** under Rule WQL 15, Rule WQL22, Rule WQL 28, or Rule WQL 46; the discharge of (i) water into a river, lake or artificial watercourse; or (ii) a contaminant into water onto or into land in circumstances which may result in a contaminant entering a river, lake, or artificial watercourse; is - 1. a **discretionary activity** if the discharge is into: (a) a river or lake and the discharge complies with all of the conditions of this Rule; or (b) an artificial watercourse whether or not the discharge complies with any of the conditions of this Rule. 2. a **non-complying activity** if the discharge is into a river or lake and the discharge does not comply with any one or more of the conditions of this Rule, in which case a resource consent under Rule WQL 60 is required.	1. The Zone of Non- Compliance for a contaminant shall be calculated in accordance with Part 2 of Schedule WQL1. 2. The Zone of Non-Compliance for a contaminant discharged shall not exceed the size of the zone calculated in accordance with Part 2 of Schedule WQL1. 3. The discharge shall be directly into the water of a river or lake. 4. The discharge shall not, outside of the Zone of Non-Compliance, result in the water quality of the receiving water body being lower than the water quality standards specified in: (a) Schedule WQL1 for that river or lake type as identified on the Map Volume Part 1- Planning Maps; or (b) the Water Conservation Order for either the Ahuriri River or the Rakaia River if the discharge is to a surface water body within either of the areas of these Orders. 5. A discharge within any of the following areas shall meet the water quality standards set out in Schedule WQL1 at the point of discharge and there shall be no Zone of Non-Compliance: (a) within one kilometre upstream on a river, or within one kilometre on a lake, from an intake for a community drinking water supply listed in Schedule WQL2~~; or~~ (b) ~~a river identified in Table WQN17 of Schedule WQN 5; or~~ (c) ~~a significant spawning reach for salmon listed in Schedule WQN14.~~[308] .	The discretion of Environment Canterbury will include, but is not limited to the following matters: 1. Measures to: (a) avoid or minimise the production of waste to be discharged. (b) reduce the volume and concentration of contaminants in the discharge. 2. The availability and use of any existing waste treatment and discharge systems. 3. The location of the discharge and the impact on instream values, including recreation and amenity values, and existing uses, including water takes and discharges. 4. Measures to ensure that the rate , volume, timing, and concentration of contaminants in the discharge are managed so that the water quality standards in Schedule WQL1 for the receiving water will be achieved: (a) outside of the Zone of Non-Compliance; and (b) when river flows or lake levels are reduced below the value used to calculate the Zone of Non-Compliance. 5. Restrictions on the discharge when	**Policies** WQL1 WQL12

[308] **WQL2.106**

		the river ceases to flow or lake levels fall below the outfall. 6. Monitoring of water quality. 7. The requirement for financial contributions, or bonds. 8. The duration of a resource consent. 9. Review of resource consent conditions.	
Where rule applies This rule does not apply to all areas/ situations in the Canterbury region – see Table WQL 7: Index of rules			
Information to be provided An application for a resource consent under this rule must meet the information requirements set out in Section 1.3.4 and Section 4.7.			

Rule WQL57 Discharge of a contaminant onto or into land - discretionary activity

Activity	Conditions	Discretion	Cross reference
Except where it is: (a) **a permitted activity** under Rule WQL 2, Rule WQL 3, Rule WQL5, Rule WQL 8, Rule WQL 10, Rule WQL 11, Rule WQL 13, Rule WQL16, Rule WQL 23, Rule WQL24, Rule WQL31, Rule WQL 47, or Rule WQL 49; or (b) **a controlled activity** under Rule WQL 7, Rule WQL 12, Rule WQL 26, Rule WQL 41, or Rule WQL 50; or (c) **a restricted discretionary activity** under Rule WQL 9 or Rule WQL 27; or (d) a **discretionary activity** under Rule WQL 51, WQL 54, WQL57; or WQL58 (e) **a prohibited activity** under Rule WQL28, Rule WQL46, or Rule WQL 52**;** the discharge of a contaminant onto or into land; is -	1. The discharge shall not occur within a Community Drinking Water Supply Protection Zone for a well listed in Schedule WQL2.	Unlimited	**Policies** WQL 6 WQL8 WQL10 WQL12

Appendix WQL1 Principal water body types in Canterbury and their characteristics

Table WQL15 Summary of river types

River type	Morphology	Hydrological characteristics	River mouths	Biological communities	Instream Values
Alpine e.g. Hurunui Rakaia, Rangitata, Clarence, Waimakariri,	Most rivers have substantial braided sections. Some reaches, have a narrow deep channel where the river is incised in bedrock Some parts of the lower plains reaches are channelised – straight channel constrained by river protection works.	The source of river flows is rainfall and snowmelt, sometimes glacial influenced The flow regime is variable, with frequent flood flows or freshes. Flows respond rapidly to rainfall. Strong seasonal influence on the flow regime with low flows during autumn, winter and mid -late summer. Relatively high flows occur during spring and early summer due to snow melt and precipitation from north west winds. Large floods occur relatively frequently. High sediment supply results in unstable bed morphology and channel braiding. Water quality is generally high. Low nutrient status Groundwater fed tributaries generally have high water quality in inland areas, and variable to low water quality in lowland areas.	Under a natural flow regime, the river mouth is always open, and is only closed during an extreme storm event Coastal lagoon forms behind gravel barrier beach where river enters the sea. The size of the lagoon varies depending on flow, barrier beach structure and exposure to southerly waves. An exception is the Waimakariri River which has a sandy beach mouth and stable lagoon behind dunes.	Habitat comprises gravel substrate, high quality, cool, swift flowing water , In the upper reaches, the riverbed is largely unmodified, with indigenous vegetation In the middle and lower reaches, exotic plants, including woody weeds, are common on the open riverbed. Exotic/sport fish communities, include chinook salmon, brown trout, and rainbow trout. Native fish consist of a wide range of migratory and non-migratory species n different reaches:–Lower reaches- short-finned eel, inanga, common bully, smelt, black flounder (important whitebait and eel fisheries); Middle reaches - blue-gilled gully, torrentfish, long-finned eel; Upper reaches - alpine galaxiids, long finned eels. Algal communities in the river have a low biomass, consist mainly diatoms Invertebrate communities comprise few species of mayfly, caddisfly and midge larvae that have adapted to frequent flood disturbance. Very large populations of wading birds, including significant numbers of threatened species e.g. wrybill . Range of habitats – breeding, feeding, roosting of individual birds and large colonies.	Upper reaches & “Gorges” Largely unmodified – very high degree of naturalness and high biodiversity values Outstanding natural features and landscapes – e.g. Mt Cook national park. Very high wild & scenic values, used for wide range of recreation activities Salmon, brown trout & rainbow trout spawning in spring fed tributaries. Native fish communities. Migratory species Ngāi Tahu – mauri, Southern alps – very strong spiritual associations. Middle lower reaches Moderate to low level of naturalness. Braided rivers contribute to Canterbury identity & landscape Used extensively for recreation – fishing, jet boating Important biodiversity values - birds & native fish, including threatened

River type	Morphology	Hydrological characteristics	River mouths	Biological communities	Instream Values
					migratory species Important salmonid habitat and migratory pathway – Chinook salmon, trout Drinking water – important source of recharge for plains aquifers Ngāi Tahu – mauri, mahinga kai
Hill rivers, e.g. Ashley, Pareora Waipara, Puhi Puhi, Kahutara and Kowhai rivers	Rivers may comprise a single thread and braided sections. Some reaches have a narrow deep channel where the river is incised in bedrock. Some parts of lower plains reaches are channelised – straight channel constrained by river protection works	Flow regime in upper catchments sustained by rainfall, snow melt or lake outflow, and in the lower reaches by groundwater in some rivers. Strong seasonal pattern of river flows. High flows occur in winter when precipitation is highest, and continue into spring with snow melt and north west rainfall. Spring peak flows decline quickly compared to alpine rivers. Tributaries or sections of the main stem may cease to flow at the bed surface for part of the year. Marked diurnal changes in water temperature during the period of summer low flows. Sediment supply is high, creating unstable substrates and braided or semi- braided channels Water quality is moderately high but non point or point source discharges may lower water quality through catchments	Similar to alpine rivers. Coastal lagoon is generally smaller. The lagoon outlet closes more frequently, especially during low flows. Some rivers are highly prone to closure or have no natural mouth (e.g. Waihao R), and engineered openings or artificial structures to maintain outlets.	Fish communities comprise long- finned eel, upland bully, blue- gilled bully, torrent fish, alpine galaxiids, koaro In the lower reaches fish communities comprise – short- finned eel, inanga, common bully, smelt, black flounder. Important whitebait and eel fisheries are found in lower reaches . Invertebrate communities comprise a high diversity of mayflies, caddis flies, stoneflies. Filter feeding species are common. Algal communities comprise diatom film communities, but also filamentous algae occur in unshaded downstream reaches under low flows. Algal biomass depends on nutrient and flow conditions. Generally, the rivers are too unstable for aquatic macrophytes. Riverbed vegetation – in the upper reaches native species are reasonably common, while in the middle to lower reaches with exotic woody species predominate. Bird communities similar to alpine rivers with high numbers of waders, gulls, terns and other bird groups. Local populations – long-tailed bat occur along some rivers in South Canterbury.	Moderate to high level of naturalness in upper reaches. Braided rivers contribute to Canterbury identity & landscape Important biodiversity values - birds, long-tailed bats, & native fish, including threatened and migratory species Salmonid habitat – commonly brown trout & locally chinook salmon and brook char. Recreation & amenity especially near urban areas. Ngāi Tahu: – mauri, mahinga kai Stockwater Kaikoura coastal streams: Unique habitat type. Very high biodiversity values due to absence of exotic fish, native bush cover in close proximity to the sea., several threatened fish species.

River type	Morphology	Hydrological characteristics	River mouths	Biological communities	Instream Values
					Ngāi Tahu: mauri, mahinga kai, and many streams & springs regarded tapu for cultural or historic reasons
Rivers of the upper plains, inland basins and river valleys E.g. Hydra waters, Mary burn, Allandale stream, Cora Lynn swamp	Single thread rivers with a relatively narrow channel. The flow generally covers a stable gravel bed.	Small stable groundwater fed streams feeding into major rivers or lakes. Water quality is variable – generally very high, but lower water quality may occur where intensive land uses have developed (e.g. Amuri plains).	—	Fish communities include salmonid species (salmon, brown trout, rainbow trout, brook char) Some reaches are locally or regionally important spawning waters. Native fish species include koaro, alpine galaxiids, upland bully and long-finned eels. Highly diverse and abundant invertebrate communities under cool stable flow regimes. Algal communities consist of diatom film communities, but also filamentous algae in intensively developed areas. Bird communities, mostly waterfowl.	Mahinga kai from tributary streams. Important salmonid spawning and angling waters. Stockwater.
Lowland rivers & streams e.g. Cust, Cam, ~~Avon, Heathcote~~, Ohapi, and Waikakahi streams.[336]	River comprises a single thread channel, with a low gradient shallow channel. The flow generally covers the bed. ~~Some reaches are channelised – straight channel with regular cross-section~~	Source of flow ranges from rainfall to solely springfed from groundwater. The proportion of groundwater flow generally increases in lower reaches Rainfall dominated streams show a very strong seasonal pattern of flows, with the highest flows in winter when precipitation is highest and evapotranspiration is low. Tributaries or sections of the main stem may be dry for part of the year. Springfed streams may show little seasonality with regular year round flows. The flow regime can be modified by irrigation seasons. Water quality is variable, ranging from high quality spring fed streams to streams with highly turbid runoff. High nutrient concentrations	Rivers generally open into lagoons, estuaries or connect to lower ends of major rivers.	Fish species include wide range of native species depending upon connection to the sea - common bully, smelt, giant bully, inanga, short-finned eel. Locally, Canterbury mudfish in ephemeral streams. Invertebrates: very variable depending upon extent of fine sediments – from high insect diversity and abundance to worms, snails, midges, caddisfly. Plant communities – predominantly exotic species. Macrophytes (submerged oxygen weeds and emergent (watercress) confined to slower flowing reaches. Increased algal biomass because of higher	Modified landscape – level of naturalness is low. The presence of river and flowing water contributes to recreation and amenity values ~~especially in urban areas.~~ Fish – brown trout and native species. Canterbury mudfish threatened species Ngāi Tahu: – mauri, mahinga kai Stockwater

[336] **WQL1.59**

River type	Morphology	Hydrological characteristics	River mouths	Biological communities	Instream Values
		associated with adjacent land uses and groundwater recharge. ~~Urban areas have poor water quality particularly during rainfall, with high concentrations of sediment, nutrient and chemical contaminants.~~		nutrient concentrations Brown trout habitat – gravel bed, cool high quality water. Important spawning areas. Chinook salmon locally important e.g. Ohapi Creek). Bird communities – mostly waterfowl and deep water divers, with few waders	Recreation – angling, gamebird hunting, passive recreation, locally canoeing.
Volcanic (Banks Peninsula) streams .e.g. Kaituna, French Farm, streams	Many rivers have steep, small short catchments. The rivers have a step – pool morphology, and in the lower reaches where channel gradient declines, a fine sediment substrate predominates.	The rivers are rainfall fed, subject to rapid flow recession, and seasonally dry. Rivers have long periods of low flow, low base flows and large infrequent floods of short duration. Higher flows occur in winter when precipitation is higher. Tributaries or sections of the main stem may be dry for part of the year. The flow regime in summer months wholly influenced groundwater; and during winter influenced by rain.	Streams exit to small estuaries situated in pocket bayhead beaches or into major lakes (Lake Ellesmere/ Te Waihora and Forsyth/ Waiwera). Frequency of river mouth closure is influenced by exposure to wave action and stream flows.	Invertebrate communities –can have very high diversity of caddisflies, mayflies and stoneflies – highly endemic in some streams with forest remnants. Fish – mainly native fish species, such as banded kokopu, lamprey Lower reaches common bully, smelt, inanga, giant bully. Occasional brown trout populations in larger streams. Upper reaches and in native bush , diatom species important. Lower reaches higher algal biomass because of higher nutrient concentrations. Bird diversity low – mostly water fowl.	Moderate to high naturalness in upper reaches, remnants of indigenous vegetation. Rare or threatened native fish species, and highly endemic invertebrates. Important for passive recreation, locally swimming and picnicking. <u>Kaituna, Okana and Okuti rivers support a local trout fishery.</u>[337] Ngāi Tahu: – important centre of Māori settlement. Likely to be many wāhi tapu and wāhi taonga sites. Mauri and locally mahinaga kai
Lake fed: Natural: e.g., North Branch of Hurunui R, Lake stream, Sisters	River has a stable channel, but may have braided reaches The riverbed is generally stable, comprising cobbles embedded in fine sediments.	Typically, the rivers have a stable flow regime with no or negligible flood flows. Flood peaks rise and fall slowly. Regulated rivers – the flow regime significantly altered from their unmodified state. Flow may vary in the short-term due to power demand and reverse seasonal patterns because of storage	Generally join up with major alpine and hill rivers.	Biological communities similar to alpine rivers, but higher predominance of caddis and dipterans. Often very prolific trout and salmon populations. Middle & lower elevations riverbed vegetation is dominated by exotic species,	Overall moderate to low level of naturalness. Despite modifications rivers have high scenic values. Important recreation values; fishing, jet boating,

[337] **WQL2.78**

River type	Morphology	Hydrological characteristics	River mouths	Biological communities	Instream Values
Stream, Regulated: Pūkaki R., Waitaki R., Opuha R.		requirements. In downstream reaches, the base flows may be more stable and flood peaks are moderated. Some rivers downstream of control structures have residual flows except for recreational releases, e.g. Pūkaki R. Water quality generally reflects lake water quality, high water quality, low nutrient and low suspended sediment concentrations.		especially woody shrubs.	canoeing, water fowl hunting. Tāngata Whenua – mauri, mahinga kai. On the Waitaki R. long association with Māori as a route to the interior. Likely to be many wāhi tapu and wāhi taonga sites.
Urban rivers e.g. Avon and Healthcote[338]	River morphology reflects the underlying river type – volcanic, lowland, hill or upper plains. Reaches may have been straightened, deepened or channelised – straight channel with regular cross-section. Weirs or drop structures may be present. Fine sediment substrate now often predomin-ates compared to pre-development conditions. Small incipient channels, or tributaries in headwaters may be lost as a result of urban development.	Flow regime modified depending on proportion of urbanised catchment. Rapid changes in flows. Flood peaks higher and steeper, and lower base flows compared to similar non-urban catchments. Generally poor water quality, particularly during rainfall, with high concentrations of sediment, nutrient and chemical contaminants. High sediment load during development of land in the catchment.	Rivers may flow into estuaries e.g. Avon-Heathcote estuary/Ihutai, or lagoons e.g. Washdyke Lagoon, or join alpine or hill rivers.	Biological diversity low, dominated by a few species. Fish: common bully, smelt, inanga, giant bully, short-fin eel, occasional brown trout. Invertebrate diversity depends on sediment substrate. In fine sediments, the community is dominated by worms, snails and midge larvae. Plant communities; predominantly exotic species in the bed and on the margins. Marcophytes and emergent plants in slow flowing reaches. Bird diversity is low , mostly waterfowl.	Highly modified landscape and built environment – the level of naturalness is low. The presence of a river and flowing water contributes to recreation and amenity values. Important recreation values, include canoeing, rowing, walking.

[338] **WQL1.59**

Water Quality Schedules

Schedule WQL1 Water Quality Classes and Zones of Non Compliance

The water quality standards specified for each class shall be observed. The standards apply to discharges of water or contaminants into water or onto land where they may enter surface water, and apply in the receiving water, immediately outside of the specified Zone of Non Compliance, calculated in accordance with Part 2 of Schedule WQL1.

The effects of any natural perturbations that may affect the river or lake are not included in the standard.

Part 1: Water Quality Classes for rivers and lakes

1. Alpine Rivers, Lake-sourced Rivers, Rivers of the Inland Basins, and Lakes, in their natural state

1.1 Class NATURAL (being rivers and lakes managed to maintain their natural state)

The natural quality of the water and the natural quality of the bed substrate shall not be altered.

2. Alpine Rivers, Hill Rivers, Rivers of the Inland Basins, Lowland Rivers, Volcanic Rivers, and Urban Rivers, not in their natural state

2.1 Class ALPINE (being alpine sourced rivers managed for natural character, amenity and recreation values, Ngāi Tahu values, stock water and aquatic ecosystems)

(a) No sample of water shall contain more than 260 *Escherichia coli* per 100 millilitres.

(b) The concentration of dissolved oxygen in water shall:

  (i) exceed 80 percent of saturation concentration at any time; and

  (ii) exceed 90 percent, during daylight hours, and at all times during May to September inclusive.

(c) The natural water temperature shall not:

  (i) be changed by more than three degrees Celsius; or

  (ii) exceed 18 degrees Celsius as a daily mean temperature; or

  (iii) exceed 20 degrees Celsius as a daily maximum temperature; or

  (iv) exceed 11 degrees Celsius as a daily maximum temperature during May to September inclusive.

(d) The natural pH of the water shall not vary by more than 0.5 pH at any time of the day from the ambient diurnal variation on a continuous basis, and shall be within the range 6 to 8.5 pH units.

(e) The visual clarity of the water shall not be reduced by more than twenty percent.

(f) The natural colour of the water shall not be changed by more than five Munsell units.

(g) The average annual concentration of:

  (i) soluble inorganic nitrogen shall not be increased by more than 0.01 milligrams per litre; or

  (ii) soluble reactive phosphorus shall not be increased by more than 0.001 milligram per litre.

(h) There shall be no conspicuous growths of algal mats greater than three millimetres thick.

(i) There shall be no conspicuous growths of filamentous algae of greater than two centimetres in length.

(j) For lake sourced rivers and rivers of the inland basins, emergent macrophytes shall not cover more than 50 percent the water surface of the wetted channel.

(k) The concentration of total ammonia shall not exceed:

(i) 0.05 milligrams of ammonia nitrogen per litre, the average result of ten samples taken every third day; and

(ii) 0.5 milligrams of ammonia nitrogen per litre for a single sample.

(l) The dissolved organic carbon concentration of the water shall not exceed one gram per cubic metre.

(m) The embeddedness of substrate in gravel or cobble bed rivers shall not exceed 20 percent.

(n) The concentration of any toxicant listed in Table WQL 19 in Part 2 of this Schedule, measured as the total fraction, shall not exceed the concentration specified for the 99 percent level of protection for that toxicant.

(o) There shall no conspicuous oil or grease films, scums or foams, or floatable or suspended materials.

2.2 Class HILL (being hill sourced rivers managed for natural character, amenity and recreation values, Ngāi Tahu values, stockwater and aquatic ecosystems)

(a) No sample of water shall contain more than 260 *Escherichia coli* per 100 millilitres.

(b) The concentration of dissolved oxygen in water shall:

(i) exceed 80 percent of saturation concentration at any time; and

(ii) exceed 90 percent saturation concentration, during daylight hours and at all times during May to September inclusive.

(c) The natural water temperature shall not:

(i) be changed by more than three degrees Celsius; or

(ii) exceed 11 degrees Celsius as a daily maximum temperature during May to September inclusive.

(d) The natural pH of the water shall not vary by more than 0.5 pH at any time of the day from the ambient diurnal variation on a continuous basis, and shall be within the range 6 to 9.

(e) The visual clarity of the water shall not be reduced by more than twenty percent.

(f) The natural colour of the water shall not be changed by more than five Munsell units.

(g) The average annual concentration of:

(i) soluble inorganic nitrogen shall not be increased by 0.02 milligrams per litre; or

(ii) soluble reactive phosphorus shall not be increased by 0.002 milligram per litre.

(h) The concentration of total ammonia shall not exceed:

(i) 0.05 milligram of nitrogen per litre, the average result of ten samples taken every third day, and

(ii) 0.5 milligram of nitrogen per litre for a single sample.

(i) The dissolved organic carbon concentration of the water shall not exceed one gram per cubic metre.

(j) The embeddedness of substrate in gravel or cobble bed rivers shall not exceed 20 percent.

(k) The concentration of any toxicant listed in Table WQL19 in Part 2 of this Schedule, measured as the total fraction, shall not exceed the concentration specified for the 99 percent level of protection for that toxicant.

(l) There shall no conspicuous oil or grease films, scums or foams, or floatable or suspended materials.

2.3 Class INLAND (being inland rivers managed for natural character, amenity and recreation values, Ngāi Tahu values, stockwater and aquatic ecosystems)

(a) No sample of water shall contain more than 260 *Escherichia coli* per 100 millilitres.

(b) The concentration of dissolved oxygen in water shall:

(i) exceed 80 percent of saturation concentration at any time; and

(ii) exceed 90 percent, during daylight hours, and at all times during May to September inclusive.

(c) The natural water temperature shall not:

(i) be changed by more than three degrees Celsius; or

(ii) exceed 18 degrees Celsius as a daily mean temperature; or

(iii) exceed 20 degrees Celsius as a daily maximum temperature; or

(iv) exceed 11 degrees Celsius as a daily maximum temperature during May to September inclusive.

(d) The natural pH of the water shall not vary by more than 0.5 pH at any time of the day from the ambient diurnal variation on a continuous basis, and shall be within the range 6 to 9 pH units.

(e) The visual clarity of the water shall not be reduced by more than twenty percent.

(f) The natural colour of the water shall not be changed by more than five Munsell units.

(g) The average annual concentration of:

(i) soluble inorganic nitrogen shall not be increased by more than 0.01 milligrams per litre; or

(ii) soluble reactive phosphorus shall not be increased by more than 0.001 milligram per litre.

(h) There shall be no conspicuous growths of algal mats greater than three millimetres thick.

(i) There shall be no conspicuous growths of filamentous algae of greater than two centimetres in length.

(j) For lake sourced rivers and rivers of the inland basins, emergent macrophytes shall not cover more than 50 percent of the water surface.

(k) The concentration of total ammonia shall not exceed:

(i) 0.05 milligrams of nitrogen per litre, the average result of ten samples taken every third day; and

(ii) 0.5 milligrams of nitrogen per litre for a single sample.

(l) The dissolved organic carbon concentration of the water shall not exceed one gram per cubic metre.

(m) The embeddedness of substrate in gravel or cobble bed rivers shall not exceed 20 percent.

(n) The concentration of any toxicant listed in Table WQL 19 in Part 2 of this Schedule, measured as the total fraction, shall not exceed the concentration specified for the 99 percent level of protection for that toxicant.

(o) There shall no conspicuous oil or grease films, scums or foams, or floatable or suspended materials.

2.4 Class LOWLAND (being lowland rivers managed for natural character, amenity and, Ngāi Tahu values, stockwater and aquatic ecosystems)

(a) No sample of water shall contain more than the median concentration of faecal coliforms shall not exceed 100 faecal coliforms per 100 millilitres and no more than one out of five samples exceeding 400 faecal coliforms per 100 millilitres.

(b) The concentration of dissolved oxygen in water shall:

(i) exceed 80 percent of saturation concentration at any time; and

(ii) exceed 90 percent of saturation concentration during daylight hours, and at all times during May to September inclusive.

(c) The natural water temperature shall not:

(i) be changed by more than three degrees Celsius; or

(ii) exceed 20 degrees Celsius as a daily maximum temperature; or

(iii) exceed 11 degrees Celsius as a daily maximum temperature during May to September inclusive.

(d) The natural pH of the water shall not be vary by more than 0.5 pH at any time of the day from the ambient diurnal variation on a continuous basis, and shall be within the range 6 to 9.

(e) The visual clarity of the water shall not be reduced by more than twenty percent

(f) The colour of the water shall not be changed by more than five Munsell units.

(g) The average annual concentration of:

(i) soluble inorganic nitrogen shall not be increased by 0.02 milligrams per litre; or

(ii) soluble reactive phosphorus shall not be increased by exceed 0.002 milligram per litre.

(h) The concentration of total ammonia shall not exceed:

(i) 0.1 milligram of nitrogen per litre, the average result of ten samples taken every third day; and

(ii) 0.9 milligram of nitrogen per litre for a single sample.

(i) The dissolved organic carbon concentration of the water shall not exceed one gram per cubic metre.

(j) Algal mats greater than three millimetres thick shall not cover more than 60 percent of the wetted channel.

(k) Filamentous algae of greater than two centimetres in length shall not cover more than 30 percent of the wetted channel.

(l) Emergent macrophytes shall not cover 50 percent of the water surface of the wetted channel.

(m) The embeddedness of substrate in gravel or cobble bed rivers shall not exceed 40 percent.

(n) The concentration of any toxicant listed in Table WQL19 in Part 2 of this Schedule, measured as the total fraction, shall not exceed the concentration specified for the 95 percent level of protection for that toxicant.

(o) There shall no conspicuous oil or grease films, scums or foams, or floatable or suspended materials.

2.5 Class VOLC (being volcanic sourced rivers managed for natural character, amenity Ngāi Tahu values, stockwater and aquatic ecosystems)

(a) No sample of water shall contain more than the median concentration of faecal coliforms shall not exceed 100 faecal coliforms per 100 millilitres and no more than one out of five samples exceeding 400 faecal coliforms per 100 millilitres

(b) The concentration of dissolved oxygen in water shall:

  (i) exceed 80 percent of saturation concentration at any time; and

  (ii) exceed 90 percent saturation concentration during daylight hours, and at all times during May to September inclusive.

(c) The natural water temperature shall not:

  (i) be changed by more than three degrees Celsius; or

  (ii) exceed 20 degrees Celsius as a daily maximum temperature; or

  (iii) exceed 11 degrees Celsius as a daily maximum temperature during May to September inclusive.

(d) The natural pH of the water shall vary by more than 0.5 pH at any time of the day on a continuous basis, and shall be within the range 6 to 9.

(e) The visual clarity of the water shall not be reduced by more than twenty percent.

(f) The natural colour of the water shall not be changed by more than five Munsell units.

(g) The average annual concentration of:

  (i) soluble inorganic nitrogen shall not exceed 0.02 milligrams per litre; or

  (ii) soluble reactive phosphorus shall not exceed 0.002 milligram per litre

(h) Emergent macrophytes shall not cover 50 percent of the water surface of the wetted channel.

(i) The concentration of total ammonia shall not exceed:

  (i) 0.05 milligrams of nitrogen per litre, the average result of ten samples taken every third day; and

  (ii) 0.5 milligrams of nitrogen for a single sample.

(j) The dissolved organic carbon concentration of the water shall not exceed one gram per cubic metre.

(k) The embeddedness of substrate in gravel or cobble bed rivers shall not exceed 40 percent.

(l) The concentration of any toxicant listed in Table WQL19 in Part 2 of this Schedule, measured as the total fraction, shall not exceed the concentration specified for the 95 percent level of protection for that toxicant.

(m) There shall no conspicuous oil or grease films, scums or foams, or floatable or suspended materials.

2.6 Class URBAN (being urban rivers managed for amenity and aquatic ecosystems)

(a) The concentration of dissolved oxygen in water shall:

(i) exceed 80 percent of saturation concentration at any time; and

(ii) exceed 90 percent of saturation concentration during daylight hours, and at all times during May to September inclusive.

(b) The natural water temperature shall not:

(i) be changed by more than three degrees Celsius; or

(ii) exceed 20 degrees Celsius as a daily maximum temperature; or

(iii) exceed 11 degrees Celsius as a daily maximum temperature during May to September inclusive.

(c) The natural pH of the water shall not be vary by more than 0.5 pH at any time of the day from the ambient diurnal variation on a continuous basis, and shall be within the range 6 to 9.

(d) The visual clarity of the water shall not be reduced by more than thirty percent

(e) The colour of the water shall not be changed by more than ten Munsell units.

(f) The average annual concentration of:

(i) soluble inorganic nitrogen shall not be increased by 0.02 milligrams per litre; or

(ii) soluble reactive phosphorus shall not be increased by exceed 0.002 milligram per litre.

(g) Algal mats greater than three millimetres thick shall not cover more than 60 percent of the wetted channel.

(h) Filamentous algae of greater than two centimetres in length shall not cover more than 30 percent of the wetted channel.

(i) Emergent macrophytes shall not cover 50 percent of the water surface of the wetted channel.

(j) The concentration of total ammonia shall not exceed:

(i) 0.1 milligram of nitrogen per litre, the average result of ten samples taken every third day; and

(ii) 0.9 milligram of nitrogen per litre for a single sample.

(k) The dissolved organic carbon concentration of the water shall not exceed one gram per cubic metre.

(l) The embeddedness of substrate shall not exceed 40 percent upstream of the reaches subject to tidal influences.

(m) The concentration of any toxicant listed in Table WQL 19 in Part 2 of this Schedule, measured as the total fraction, shall not exceed the concentration specified for the 90 percent level of protection for that toxicant.

(n) There shall no conspicuous oil or grease films, scums or foams, or floatable or suspended materials.

3. Lakes not in their natural state

3.1 Class LAKECOL (Lake Coleridge being **managed** for natural character, amenity and recreation values, Ngai Tahu values, and aquatic ecosystems, including the deep water macrophyte community.)

(a) The natural quality of the water, excluding water clarity, shall not be altered.

(b) The visual clarity of the water shall not be reduced by more than ten per cent.

(c) The visual clarity of the lake measured at the mid-lake monitoring point shall have a mean annual Secchi depth of more than twelve metres with a standard deviation of not more than two metres.[342]

~~**3.1 Class HIGHLAKE (being high country lakes managed for natural character, amenity and recreation values, Ngāi Tahu values, and aquatic ecosystems)**~~

~~(a) No sample of water shall contain more than 130 *Escherichia coli* per 100 millilitres.~~

~~(b) The concentration of dissolved oxygen in water shall exceed 90 percent of saturation concentration at any time measured at any depth, at least 0.5 metres below the surface of the lake.~~

~~(c) The natural water temperature shall not be changed by more than one degree Celsius.~~

~~(d) The natural pH shall not be changed by more than 0.1 pH at any time of the day on a continuous basis.~~

~~(e) The visual clarity of the water shall not be reduced by more than ten percent.~~

~~(f) The natural colour of the water shall not be changed by five Munsell units.~~

~~(g) The average annual concentration of:~~

~~(i) total nitrogen shall not exceed 160 milligrams per cubic metre; or~~

~~(ii) total phosphorus shall not exceed 9.0 milligrams per cubic metre.~~

~~(h) The concentration of total ammonia shall not exceed:~~

~~**(i)** 0.05 milligrams of ammonia nitrogen per litre, the average result of ten samples taken every third day; and~~

~~(ii) 0.5 milligrams of nitrogen per litre for a single sample.~~

~~(i) The dissolved organic carbon concentration of the water shall not exceed one gram per cubic metre.~~

~~(j) The concentration of any toxicant listed in Table WQL19 in Part 2 of this Schedule, measured as the total fraction, shall not exceed the concentration specified for the 99 percent level of protection for that toxicant.~~

~~(k) There shall no conspicuous oil or grease films, scums or foams, or floatable or suspended materials excluding those of natural origin.~~ [343]

3.2 Class COAST (being coastal lakes managed for natural character, amenity values, Ngāi Tahu values, and aquatic ecosystems)

(a) The concentration of *Escherichia coli* shall not increase by more than 130 E. coli per 100 millilitres and no sample of water shall contain more than 260 Escherichia coli per 100 millilitres.

(b) The concentration of dissolved oxygen in water shall exceed 80 percent of saturation concentration at any time measured at any depth at least 0.5 metres below the surface of the lake.

(c) The natural water temperature shall not be changed by more than one degree Celsius; or

[342] **WQL2.28, WQL2.55**

[343] **WQL2.56**

Chapter 5: Water Quantity

5.5.2 Surface water management~~Rivers, lakes and groundwater~~ [73]

Issue WQN1 Surface water management~~Rivers and lakes~~[74]

The taking, using, damming, and diverting of surface water, and taking from groundwater, can affect river flows, lake levels and wetlands, leading to adverse effects on:

- **(a) the value of surface water bodies for providing ~~potable~~ sources of drinking [75]water for people and stock;**
- **(b) the life-supporting capacity of surface water bodies, including habitat availability, and the composition and abundance of indigenous species, trout and salmon[76];**
- **(c) the frequency and duration of river mouth closures, particularly on smaller rivers;**
- **(d) passage of indigenous fish species, salmon and trout;**
- **(e) the composition and extent of indigenous riparian and littoral vegetation;**
- **(f) the frequency and magnitude of floods and freshes and their capacity to reshape channel morphology, remove excessive algal growths,[77] rejuvenate the bed of a river, and remove exotic plant species that cause a loss of river-bed habitat;**
- **(g) the value of the water body to Ngāi Tahu, including the water body's mauri, and capacity to provide mahinga kai, and to protect wāhi tapu and wāhi taonga;**
- **(h) the natural character and landscape values of water bodies; and**
- **(i) the amenity values (including recreational values) of a water body.**

Objective WQN1 Surface water management~~Rivers and lakes~~[78]

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~~ drinking[79] water for people and ~~for~~[80] stock;**
- **(b) safeguarding the life-supporting capacity of the water, including its**

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[73] WQN5.4, WQN5.16

[74] WQN5.4, WQN5.16

[75] WQN5.8

[76] WQN5.9

[77] WQL2.9

[78] WQN5.4, WQN5.16

[79] WQN5.8

[80] WQN5.18

Policy WQN3 Flow and level regimes

(1) For ~~all~~[96] water bodies where taking, using, damming, diverting or discharging of water occurs or is likely to occur, Environment Canterbury will progressively set flow or level regimes in Schedule WQN1 and Schedule WQN3 to meet the requirements of Objective WQN1, having regard to the matters listed in Policy WQN4, Policy WQL2 and also to meet the ~~requirements of Chapter 4 – Water Quality~~ Objective WQL1~~.1~~.[97]

(2) Establish and maintain these flow and level regimes by:

(a) controlling the taking, using, diverting or damming of surface water, and the discharge of water to surface water;

(b) controlling the effects of landuse on water yield in flow sensitive catchments(refer to Policies WQN6 and WQN7);

(c) controlling the taking and using of water from an individual bore or borefield where this causes a direct or high ~~or moderate~~[98] stream depletion effect (Refer Policy WQN8);

(d) limiting all groundwater abstractions which cumulatively reduce groundwater levels and thereby cause or are likely to cause a significant increase in the frequency, duration or severity of breaches of a minimum flow, or adversely affect the hydrology of a wetland (Refer Policy WQN9 and Policy WQN14);

(e) not allowing abstraction of water to induce a river to go dry; and

(f) not allowing the taking, using, diverting or damming of surface water, or the discharge of water to surface water, to result in a change to the water quality contrary to ~~Chapter 4 — Water Quality Objective WQL1.1.~~ Policy WQL2.[99]

Explanation and principal reasons

Any flow or level regime set has to meet the requirements of Objective WQN1. The two-step process set out in the CRPS, Chapter 9, policies 1 and 2, and briefly described under Objective WQN1, is to be applied. The values (a) to (h) in the objective ~~provide a framework~~ identify instream values that ~~is~~ are to be ~~applied to~~ considered for [100]each water body when determining the appropriate ~~minimum flow/flow~~ flow or level[101] regime. Whenever Environment Canterbury is making such a determination for a water body, it shall receive a report that explicitly considers each value in the objective, its significance/relevance for that water body, and the ~~minimum flow/flow~~ flow or level[102] regime requirements to adequately provide for each significant/relevant value. The report should also consider the effects on the reliability of supply for existing and potential users who take, dam, divert or discharge water,

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[96] **WQN5.44**

[97] **WQL2.48**

[98] **WQN3.14**

[99] **WQL2.48**

[100] **WQN5.60**

[101] **WQN5.35**

[102] **WQN5.35**

and for larger water resources, any economic consequence for the region and nation[103]. The matters listed in Policy WQN4 are also to be used to guide the setting of flow and level regimes or assessing resource consent applications where there is no regime[104]. The effect of ~~flow regimes~~ flow and level regimes[105] on water quality will also need to be considered and this is the purpose of the reference to Objective WQL1.1 and Policy WQL2.[106]

A flow regime will include a minimum flow and may include additional provisions such as flow[107] sharing or a cap on abstraction where this is needed (see section 5.4.1.2 for more on additional provisions)[108]~~, for example, to help maintain small freshes that flush periphyton or fine sediment from the bed of a river.~~ Minimum flow provisions are necessary to prevent abstraction, diversion or damming from inducing low river flows that adversely affect instream values. Additional provisions such as flow sharing or a cap on abstraction would be considered where flow variability above the minimum flow is required. Flow variability above the minimum flow may be appropriate to, maintain seasonal requirements of instream values, maintain ecosystems that require variation in flows, or maintain small freshes that flush periphyton or fine sediment from the bed of a river. Some of these additional provisions can be achieved through mechanisms in Schedule WQN1 such as allocation blocks, progressively larger minimum flows for each allocation block and restriction trigger levels.[109]

The flow and level regimes that have been established, combined with allocation regimes, create water management regimes which[110] are set out in Schedule WQN1 and where appropriate in Schedule WQN3. Explanations and reasons for these follow the schedule and include the purpose of management for which the flow or level regime has been set. Groundwater limits and levels will be set for groundwater bodies where this can help sustain surface water flows to meet Objective WQN1.

Policy WQN3(2)(a) intends that surface water flow regimes will be managed by controlling the taking, using, diverting or damming of water. It also refers to discharges of water to water where this will impact on the flow or level regime. This is something that may occur as part of a diversion where some of the water may be returned to the water source, or it may occur as part of an augmentation scheme. The water quality of the discharge water is also addressed by policies and provisions in Chapter 4 Water Quality.

Policy WQN3(2)(b) refers to provisions that are included in policies WQN6 and WQN7 to address the effects of landuse change on water yield in flow sensitive catchments. This is discussed in more detail in that section.

Policy WQN3(2)(c) and (d) complement each other. Minimum flows and the hydrology of wetlands can be compromised by groundwater abstractions that:

(a) prevent groundwater, for example, spring flow, naturally entering a river or wetland; or

(b) induce a river to lose flow through its bed.

The consequence of this can be an increase in the frequency, duration and severity of periods when a river is below its minimum flow, or a wetland suffers lower than natural water levels.

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[103] WQN5.65

[104] WQN5.72

[105] WQN5.35

[106] WQL2.48

[107] WQN5.31, WQN5.32, WQN5.33,WQN5.73, WQN5.74, WQN5.75, WQN5.146

[108] WQN5.35,

[109] WQN5.31, WQN5.32, WQN5.33, WQN5.73, WQN5.74, WQN5.75, WQN5.146

[110] WQN5.31, WQN5.32, WQN5.33, WQN5.73, WQN5.74, WQN5.75, WQN5.146

It is equitable that restrictions are placed on groundwater takes with such significant ~~direct~~ [111]stream depletion effects. It is also equitable that limits are placed on the amount of groundwater that can be taken overall from a catchment to manage the more widespread lowering of groundwater levels. This is because such lowering can increase the frequency, duration or severity of breaches of a minimum flow or adversely affect the hydrology of a wetland. Restrictions would be in proportion to the adverse effect, i.e. those causing direct significant ~~direct~~ [112]stream depletion effects would be restricted more severely than those causing only indirect cumulative effects. Policy WQN8 sets out the approach for managing ~~direct~~[113] stream depletion effects. Policies WQN9 and WQN14 address the indirect cumulative effects of groundwater abstractions on surface flows. Policy WQN9 aims to prevent significant long-term decline of groundwater and Policy WQN14 sets limits to the amount of groundwater that can be allocated and in so doing aims to retain sufficient water in the ground to sustain stream flows.

Some rivers in Canterbury periodically go dry. While this may occur naturally, rivers should not be induced to go dry as a result of surface or groundwater abstractions. Policy WQN3(2)(e) prevents this from occurring. Takes that affect surface water flows will be required to reduce and/or cease when the minimum flow is reached. However, under Policy WQN19, groundwater abstractions may be able to recommence after a river has gone dry naturally.

Policy WQN3(2)(f) ~~links to~~ also addresses the issue of water quality. Water quality outcomes are set in Chapter 4. ~~The abstraction of water~~ A change to the flow of a river can directly or indirectly contribute to changes in water quality. For example, reduced flow in summer may contribute to higher water temperatures in the residual flow or water removed won't be available to contribute to mixing of contaminants that are to be discharged. The relationships between flows or levels and water quality will need to be considered when setting flow or level regimes or when granting resource consents that affect river flows. [114]

Methods

The methods used or to be used to implement Policy WQN3 are:

Method WQN3(a) Advocacy

Environment Canterbury will:

(a) advocate to Te Rūnanga O Ngāi Tahu and papatipu rūnanga that resource management plans be prepared for the rohe of individual rūnanga, or for groups of rūnanga, that detail specific resource management issues and the outcomes that are sought;

(b) advocate participation of all interested parties in the development of flow and level regimes for Canterbury's water bodies. Approaches may include participation on working parties, e.g. Ashley River/Rakahuri and Ashburton River/Hakatere, advisory groups and technical panels, e.g. Lake Ellesmere/Te Waihora and its catchment, or water users and enhancement[115] groups[116];

(c) advocate to water permit holders and to the people operating under water permits to be aware of, and comply with, the flow and level regimes that apply, particularly when water restrictions are likely; and

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[111] **WQN3.14**

[112] **WQN3.14**

[113] **WQN3.14**

[114] **WQL2.48**

[115] **WQN5.62**

[116] **WQN1.27**

(2) ~~In order to provide for the indicator values listed above,~~ In addition to (1) matters to be considered when setting flow regimes for rivers, or assessing resource consent applications where there is no flow regime, ~~shall~~ should[140] include:

(a) the impact of the flow regime on the size and frequency of flows and the effect of these on:

(i) processes needed to clear gravel river beds of invading exotic vegetation;

(ii) processes needed to remove periphyton accumulation from the substrate;

(iii) processes needed to remove the build up of fine sediment;

(iv) processes needed to transport gravel and contribute to coastal sediment budgets;

(v) ~~natural~~ the functioning of the river mouth including the opening and closing of the mouth and timing relative to migrations of fish, and the exchange of freshwater and seawater;[141]

(vi) mauri, mahinga kai values, wāhi tapu sites or areas, and wāhi taonga;

(vii) natural character, natural features and landscapes[142];

(viii) aquatic ecosystems, including intrinsic values, indigenous vegetation, and habitats for indigenous birds ~~and~~, fish (including fish passage) and other fauna;[143]

(ix) habitats, spawning areas and ~~access~~ passage[144] for trout and salmon; and

(x) processes needed to assimilate any waste discharges or to maintain water quality and the characteristics of river bed substrate in accordance ~~consistent~~ with ~~Chapter 4 – Water Quality~~ Objective WQL1.1 ~~(1)~~ and Policy WQL2[145];

(xi) water levels in wetlands;[146]

(xii) amenity, including wild and scenic values;[147]

(b) the need for sharing water, above the minimum flow, [148]between instream and abstractive uses; and

~~(c) the cumulative and long-term effect of groundwater abstractions not controlled by Policy WQN3(2)(b); and~~[149]

(c) ~~(d)~~ the need for an absolute cap on the rate or amount of water that can be abstracted.

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[140] WQN5.72

[141] WQN5.114

[142] WQN5.116

[143] WQN5.107

[144] WQN5.107

[145] WQL2.48

[146] WQN5.95

[147] WQN5.107

one or two rivers within a river type are well understood, then these attributes can be generally applied to other rivers in the same river type, even where little may be known about them. This situation is most likely to arise with smaller rivers as all the larger rivers have at some stage been subject to major studies and planning exercises.

In identifying a flow regime, there will be some important values that have higher flow requirements than other values. These are called indicator values. In most cases, meeting the higher flow requirements of these indicator values will also meet the requirements of those values that can be satisfied with lower flows.

The table above has identified for each river type, the major indicator values that should be managed for. This is not intended in any way to diminish the significance of other values associated with a river type where these values have lower flow requirements.

In addition to the indicator values, lists of criteria or matters that should be considered when setting flow or level regimes or when considering a damming proposal are set out in Policy WQN4(2) and WQN(4)(3). These lists are not exhaustive and other matters may be relevant in a particular case.

A change to the flow or level of a river or lake as a result of an activity, such as taking, damming, augmentation or diversion or of water, or the establishment of a new flow regime, can have significant adverse effects on the quality of water and the river bed substrate and thereby affect aquatic ecosystems and instream values. The references to the provisions of Chapter 4 - Objective WQL 1.1 and Policy WQL 2 are included in Policy WQN4 to ensure that rivers and lakes are managed in an integrated manner and that any effects on water quality and the characteristics of the river bed substrate are taken into account when there are changes to the flow or level of a water body.[154]

Many regulated lakes, particularly naturally occurring ones, are highly valued for non-commercial reasons such as their recreation, amenity or mahinga kai values. Managers of activities that affect lake levels will need to determine the operating range intended for the activity proposed and demonstrate that this is appropriate in relation to the matters listed. Managers of these lakes will have a duty to maintain the lake within the consented operating range to avoid adverse effects on those values.

When looking to develop a lake consideration will need to be given to the water quality implications of its establishment and management, Objective WQL1.2 sets specific water quality standards that will need to be adhered to. Proposals to take, divert, dam water to develop and operate a lake will need to determine the likely effect of the lake development and operation on water quality and demonstrate that these effects will not compromise the water quality outcomes.

This policy is intended to apply to both existing regulated lakes, and any new artificial lakes created through damming of a water body. Where water is dammed and stored out of a water body (most likely for irrigation use) then some of the matters to be considered will be of less concern. This is why it will be important to establish the purpose of management. Where the lake formed by the dam is within a water body, and flows are to be released down stream then more of the matters listed will need to be considered because the establishment and management of the lake will have wider environmental consequences.

Methods

The methods used or to be used to implement Policy WQN4 are:

[154] **WQL2.48**

Method WQN4(d) Resource consents

When considering ~~R~~resource consents for the taking, damming or diverting of water within these water bodies ~~shall only be granted where they are in accordance with~~ Environment Canterbury will have regard to[157] Policy WQN4 and Policy WQL2.[158] Resource consents will need to be granted with conditions that are consistent with the flow and level regimes that are established in Schedule WQN1. Where no flow or level regimes are established matters listed in this policy shall be considered when setting a flow or level condition. Consents sought for water permits to take, dam or divert water in the interim period may include a condition that identifies the intention to review conditions.

When considering the duration of any resource consent, Environment Canterbury will set the duration of the resource consent for as long as is consistent with the purpose of the RMA, and shall have particular regard to the matters set out in Section 1.3.5 and to the guidelines for consent duration set out in Sections 5.8 and 5.9.[159]

[157] **WQN5.143**

[158] **WQL2.48**

[159] **GEN1.102, WQN1.7, WQN1.16, WQN1.140**

Enable the augmentation of water resources provided that:

(a) it is consistent with, or better achieves, provisions (a) to (h) of Objective WQN1, ~~Objective WQL1.1 (2)~~ and the relevant provisions of Objective WQL1~~.2 (3)~~[331];

(b) it will not adversely affect existing water permit holders' reliability of supply and access to water; and

(c) it will result in long-term social, economic and environmental benefits to the regional community.

Explanation and principal reasons

There are a number of ways to augment water bodies and a number of reasons. The methods may include diversions from large or small rivers and discharge into a different river or groundwater, or large storage dams like the Opuha Dam. These may be intended for instream enhancement, improving supply reliability for existing and new abstractors or for a combination of these. Each method will have effects on the source water body and on the receiving water body. The aim of the objective is to ensure that important values are not degraded or lost, and that existing water permit holders' access to water is not unfairly compromised. There may even be opportunities to improve the water quality of a receiving water body, although this is not necessarily a requirement.[332] Where a change that will be caused by augmentation is significant, a net sustainable benefit to the wider community must be demonstrated.

Policy WQN21 Managing the effects of augmentation

(1) Before augmentation proposals are allowed, particularly where the augmentation scheme involves damming a river, raising a lake or discharging to another river, proponents need to show that:

(a) existing available water is, or will be, effectively allocated and efficiently used,

(b) any adverse effects on water quality and bed substrate are managed in accordance with Policy WQL2, and; ~~that~~

(c) any other adverse ~~the~~ [333]effects on environmental and Ngāi Tahu values are avoided, remedied or mitigated.

(2) When considering ways to avoid, remedy or mitigate effects on environmental and Ngai Tahu values in terms of (1) above:

(a) Policy WQL1(1)(b) shall apply w~~W~~here water is diverted from one catchment and discharged into another ~~Policy WQL1(1)(b) shall apply.~~ part of the same catchment, or into another catchment; and

(b) Policy WQN4(3) shall apply when damming water and/or setting operating and level regimes for natural or artificial lakes associated with an augmentation proposal.[334]

[331] **WQN6.12**

[332] **WQN6.12**

[333] **WQL2.49**

[334] **WQN6.16**

Plan implementation	Criteria for assessment	Method of assessment	Reporting
			Annually in the Environment Canterbury annual compliance monitoring report Annually in the annual environmental incidents and enforcement report

Appendix WQN1: Summary of water body types in Canterbury

Table WQN8: Summary of river types

River type	Morphology	Hydrological characteristics	River mouths	Biological communities	Instream Values
Alpine e.g. Hurunui Rakaia, Rangitata, Clarence, Waimakariri,	Most rivers have substantial braided sections. Some reaches, have a narrow deep channel where the river is incised in bedrock. Some parts of the lower plains reaches are channelised – straight channel constrained by river protection works.	The source of river flows is rainfall and snowmelt, sometimes glacial influenced The ~~flow regime~~ natural flow regime is variable, with frequent flood flows or freshes. Flows respond rapidly to rainfall. Strong seasonal influence on the ~~flow regime~~ natural flow regime with low flows during autumn, winter and mid - late summer. Relatively high flows occur during spring and early summer due to snow melt and precipitation from north-west winds. Large floods occur relatively frequently. High sediment supply results in unstable bed morphology and channel braiding. Water quality is generally high. Low nutrient status Groundwater fed tributaries generally have high water quality in inland areas, and variable to low water quality in lowland areas.	Under a natural flow regime, the river mouth is always open, and is only closed during an extreme storm event Coastal lagoon forms behind gravel barrier beach where river enters the sea. The size of the lagoon varies depending on flow, barrier beach structure and exposure to southerly waves. An exception is the Waimakariri River which has a sandy beach mouth and stable lagoon behind dunes.	Habitat comprises gravel substrate, high quality, cool, swift flowing water , In the upper reaches, the riverbed is largely unmodified, with indigenous vegetation. In the middle and lower reaches, exotic plants, including woody weeds, are common on the open riverbed. Exotic/sport fish communities, include chinook salmon, brown trout, and rainbow trout. Native fish consist of a wide range of migratory and non-migratory species in different reaches:–Lower reaches - short-finned eel, inanga, common bully, smelt, black flounder (important whitebait and eel fisheries); Middle reaches - blue-gilled bully, torrentfish, long-finned eel; Upper reaches - alpine galaxiids, long finned eels. Algal communities in the river have a low biomass, consist mainly diatoms Invertebrate communities comprise few species of mayfly, caddisfly and midge larvae that have adapted to frequent flood disturbance.	Upper reaches & "Gorges" Largely unmodified – very high degree of naturalness and high biodiversity values Outstanding natural features and landscapes – e.g. Mt Cook national park. Very high wild & scenic values, used for wide range of recreation activities Salmon, brown trout & rainbow trout spawning in spring fed tributaries. Native fish communities. Migratory species Ngāi Tahu – mauri, Southern alps – very strong spiritual associations. Middle lower reaches Moderate to low level of naturalness. Braided rivers

River type	Morphology	Hydrological characteristics	River mouths	Biological communities	Instream Values
				Very large populations of wading birds, including significant numbers of threatened species e.g wrybill. Range of habitats – breeding, feeding, roosting of individual birds and large colonies.	contribute to Canterbury identity & landscape Used extensively for recreation – fishing, jetboating. Important biodiversity values - birds & native fish, including threatened migratory species Important salmonid habitat and migratory pathway – Chinook salmon, trout Drinking water – important source of recharge for plains aquifers Ngāi Tahu – mauri, mahinga kai
Hill rivers, e.g. Ashley, Pareora Waipara, Puhi Puhi, Kahutara and Kowhai rivers	Rivers may comprise a single thread and braided sections. Some reaches have a narrow deep channel where the river is incised in bedrock. Some parts of lower plains reaches are channelised – straight channel constrained by river protection works	~~Flow regime~~ Natural flow regime[362] in upper catchments sustained by rainfall, snow melt or lake outflow, and in the lower reaches by groundwater in some rivers. Strong seasonal pattern of river flows. High flows occur in winter when precipitation is highest, and continue into spring with snow melt and north-west rainfall. Spring peak flows decline quickly compared to alpine rivers. Tributaries or sections of the main stem may cease to flow at the bed surface for part of the year. Marked diurnal changes in water temperature during the period of summer low flows. Sediment supply is high, creating unstable substrates and braided or semi- braided channels Water quality is moderately high but non point or point source discharges may lower water	Similar to alpine rivers. Coastal lagoon is generally smaller. The lagoon outlet closes more frequently, especially during low flows. Some rivers are highly prone to closure or have no natural mouth (e.g.Waihao R), and engineered openings or artificial structures to maintain outlets.	Fish communities comprise long- finned eel, upland bully, blue-gilled bully, torrent fish, alpine galaxiids, koaro. In the lower reaches fish communities comprise – short- finned eel, inanga, common bully, smelt, black flounder. Important whitebait and eel fisheries are found in lower reaches. Invertebrate communities comprise a high diversity of mayflies, caddis flies, stoneflies. Filter feeding species are common. Algal communities comprise diatom film communities, but also filamentous algae occur in unshaded downstream reaches under low flows. Algal biomass depends on nutrient and flow conditions. Generally, the rivers are too unstable for aquatic macrophytes. Riverbed vegetation – in the upper	Moderate to high level of naturalness in upper reaches. Braided rivers contribute to Canterbury identity & landscape. Important biodiversity values - birds, long-tailed bats, & native fish, including threatened and migratory species Salmonid habitat – commonly brown trout & locally chinook salmon and brook char. Recreation & amenity especially near urban areas. Ngāi Tahu: – mauri, mahinga kai

[362] **WQN5.35**

River type	Morphology	Hydrological characteristics	River mouths	Biological communities	Instream Values
		quality through catchments		reaches native species are reasonably common, while in the middle to lower reaches exotic woody species predominate. Bird communities similar to alpine rivers with high numbers of waders, gulls, terns and other bird groups. Local populations – long-tailed bat occur along some rivers in South Canterbury.	Stockwater. Kaikoura coastal streams: Unique habitat type. Very high biodiversity values due to absence of exotic fish, native bush cover in close proximity to the sea, several threatened fish species. Ngāi Tahu: mauri, mahinga kai, and many streams & springs regarded tapu for cultural or historic reasons
Inland basin streams and rivers E.g Hydra waters, Maryburn, Allandale stream, Cora Lynn swamp	Single thread rivers with a relatively narrow channel meandering across inland basins. The flow generally covers a stable gravel bed.	Small stable groundwater fed streams feeding into major rivers or lakes. Water quality is variable – generally very high, but lower water quality may occur where intensive land uses have developed (e.g. Amuri plains).		Fish communities include salmonid species (salmon, brown trout, rainbow trout, brook char). Some reaches are locally or regionally important spawning waters. Native fish species include koaro, alpine galaxiids, upland bully and long-finned eels. Highly diverse and abundant invertebrate communities under cool stable ~~flow regimes~~ natural flow regime[363]. Algal communities consist of diatom film communities, but also filamentous algae in intensively developed areas. Bird communities, mostly waterfowl.	Mahinga kai from tributary streams. Important salmonid spawning and angling waters. Stockwater.
Lowland rivers & streams e.g. Cust, Cam, ~~Avon, Heathcote~~, Ohapi, and Waikakahi streams.[364]	River comprises a single thread channel, with a low gradient shallow channel. The flow generally covers the bed. ~~Some reaches are channelised – straight channel with regular~~	Source of flow ranges from rainfall to solely springfed from groundwater. The proportion of groundwater flow generally increases in lower reaches. Rainfall dominated streams show a very strong seasonal pattern of flows, with the highest flows in winter when precipitation is highest and evapotranspiration is low. Tributaries or sections of the main stem may be dry for part of	Rivers generally open into lagoons, estuaries or connect to lower ends of major rivers.	Fish species include wide range of native species depending upon connection to the sea - common bully, smelt, giant bully, inanga, short-finned eel. Locally, Canterbury mudfish in ephemeral streams. Invertebrates: very variable depending upon extent of fine sediments – from high insect diversity and abundance to worms,	Modified landscape – level of naturalness is low. The presence of river and flowing water contributes to recreation and amenity values ~~especially in urban areas.~~ Fish – brown trout and native species. Canterbury

[363] **WQN5.35**

[364] **WQL1.59**

River type	Morphology	Hydrological characteristics	River mouths	Biological communities	Instream Values
	~~cross section~~	the year. Springfed streams may show little seasonality with regular year round flows. The flow regime can be modified by irrigation seasons. Water quality is variable, ranging from high quality spring fed streams to streams with highly turbid runoff. High nutrient concentrations associated with adjacent land uses and groundwater recharge.~~ Urban areas have poor water quality particularly during rainfall, with high concentrations of sediment, nutrient and chemical contaminants.~~		snails, midges, caddisfly. Plant communities – predominantly exotic species. Macrophytes (submerged oxygen weeds and emergent watercress) confined to slower flowing reaches. Increased algal biomass because of higher nutrient concentrations. Brown trout habitat – gravel bed, cool high quality water. Important spawning areas. Chinook salmon locally important (eg. Ohapi Creek). Bird communities – mostly waterfowl and deep water divers, with few waders.	mudfish threatened species Ngāi Tahu: – mauri, mahinga kai Stockwater Recreation – angling, gamebird hunting, passive recreation, locally canoeing.
Volcanic (Banks Peninsula) streams .eg. Kaituna, French Farm, streams	Many rivers have steep, small short catchments. The rivers have a step – pool morphology, and in the lower reaches where channel gradient declines, a fine sediment substrate predominates.	The rivers are rainfall fed, subject to rapid flow recession, and seasonally dry. Rivers have long periods of low flow, low base flows and large infrequent floods of short duration. Higher flows occur in winter when precipitation is higher. Tributaries or sections of the main stem may be dry for part of the year. The flow regime in summer months wholly influenced groundwater; and during winter influenced by rain.	Streams exit to small estuaries situated in pocket bayhead beaches or into major lakes (Lake Ellesmere/ Te Waihora and Forsyth/ Waiwera). Frequency of river mouth closure is influenced by exposure to wave action and stream flows.	Invertebrate communities –can have very high diversity of caddisflies, mayflies and stoneflies – highly endemic in some streams with forest remnants. Fish – mainly native fish species, such as banded kokopu, lamprey. Lower reaches common bully, smelt, inanga, giant bully. Occasional brown trout populations in larger streams. Upper reaches and in native bush , diatom species important. Lower reaches higher algal biomass because of higher nutrient concentrations. Bird diversity low – mostly water fowl.	Moderate to high naturalness in upper reaches, remnants of indigenous vegetation. Rare or threatened native fish species, and highly endemic invertebrates. Important for passive recreation, locally swimming and picnicking. <u>Kaituna, Okana and Okuti rivers support a local trout fishery</u>[365] Ngāi Tahu: – important centre of Māori settlement. Likely to be many wāhi tapu and wāhi taonga sites. Mauri and locally mahinga kai
Lake fed: Natural: e.g., North Branch of Hurunui R,	River has a stable channel, but may have braided reaches. The riverbed is generally stable, comprising cobbles embedded in	Typically, the rivers have a stable flow regime with no or negligible flood flows. Flood peaks rise and fall slowly. Regulated rivers – the flow regime significantly altered from their unmodified state. Flow may vary in the short-term due to power demand	Generally join up with major alpine and hill rivers.	Biological communities similar to alpine rivers, but higher predominance of caddis and dipterans. Often very prolific trout and salmon populations.	Overall moderate to low level of naturalness. Despite modifications rivers have high scenic values. Important recreation

[365] **WQL2.78**