Section 32 Evaluation Report for the Proposed Otago Land and Water Regional Plan

Chapter 13: Environmental Flows and Levels

This Section 32 Evaluation Report should be read together with the Proposed Otago Land and Water Regional Plan

Otago Regional Council

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Abbreviations

FMU	Freshwater Management Unit
NES	National Environmental Standard
NOF	National Objectives Framework
NPS	National Policy Statement
NPSFM	National Policy Statement for Freshwater Management 2020
NPSREG	National Policy Statement for Renewable Electricity Generation 2011
ORPS	Otago Regional Policy Statement 2019
pORPS	Proposed Otago Regional Policy Statement 2021
pLWRP	Proposed Otago Land and Water Regional Plan 2024
RPS	Regional Policy Statement
RMA	Resource Management Act 1991

Environmental Flows and Levels [EFL] - Assessment of Provisions

1. Setting environmental flows, levels, and take limits

1. The EFL chapter manages water quantity in Otago and given the breadth and complexity of issues and activities managed in this chapter, the evaluation of provision in this chapter is structured into three parts. Each part evaluates a range of topics and options within each part which are all connected. These three parts provide a broad structure to evaluate provision that:

    a. Set environmental flows, levels and take limits for water bodies in Otago.

    b. Are directed towards achieving these environmental flows, levels and take limits.

    c. Manage specific activities.

2. The assessment of the proposal across a range of topics is highly variable depending on the particular water bodies affected, and degree of change required by specific topic.

1.1. Introduction

3. Environmental flows, levels, and take limits determine how much water must stay in a river, lake, or groundwater system, and how much water is available for taking. As outlined in chapter 2, water is an integral part of Otago's natural environment, and the region's diverse range of rivers, lakes, and groundwater provide a significant water resource that supports the social, economic, and cultural well-being of Otago's people.

4. A river's flow is critical to riverine ecosystems because it influences all aspects of river condition, including channel structure, sediment delivery, hydrological conditions, food resources, and water quality.

5. Fluctuation in lake levels can lead to short-term and long-term effects on the lake edge. Adverse effects arising from either low or high or low lake levels, or large fluctuations include erosion and slope or bank instability, which in turn can create hazards and cause habitat loss. For example, large fluctuation in lake levels from high to low can be detrimental to the health of macrophytes which can reduce habitat quantity and cover for fish. Other effects include reduced recreational opportunities and loss of access and amenity values. During prolonged periods of low levels, water quality issues may also arise due to the increased risk of temperature increase and algae growth.

6. Groundwater often has a dynamic hydrological connection with surface water. Most aquifers in Otago are hydrologically connected to wetlands, lakes, and springs to some degree and they contribute to the base flow of streams and rivers. Conversely, some rivers and lakes will also support the maintenance of aquifer levels by recharging groundwater. Otago's aquifers are situated in a variety of geological settings and the degree of connection varies, which generally requires a nuanced approach to managing the allocation of groundwater.

7. This section evaluates the proposal for setting environmental flows, levels and take limits for rivers, lakes and groundwater in the EFL chapter of the pLWRP.

1.2. Issues

8. This section outlines the resource management issues that the EFL chapter seeks to address. These issues are:

    a. The take and use of water can have adverse effects on the health of water bodies and the associated ecosystems.

    b. The loss and degradation of water bodies has resulted in material and cultural deprivation for Kāi Tahu ki Otago.

    c. Otago's waterbodies will be affected by climate change.

    d. The loss and degradation of water bodies is a risk to human health and well-being.

    e. The social, cultural and economic well-being of Otago's communities depends on the use and development of natural and physical resources, but that use and development can compromise or conflict with the achievement of environmental outcomes.

9. In addition to the resource management issues above, there are also specific issues with how the Water Plan sets environmental flows, levels and take limit which are summarised in the description of the regional planning framework in section 1.3.5 below.

1.2.1. The take and use of water can have adverse effects on the health of water bodies and the ecosystem they support

10. The taking and use of water from water bodies and the modification of their natural flow and level behaviour can have adverse effects on the health, form and function of these water bodies, and their receiving environments (Richter, Davis, Apse, & Konrad, 2011). Water quantity management must safeguard the life-supporting capacity of freshwater bodies and the ecosystems they support.

11. Water quantity limits such as take limits and minimum flows for rivers can manage this risk to ecosystem health if they are set at a level or rate that protects in-stream values, such as aquatic ecosystems.

12. The setting of water quantity limits to protect in-stream values is typically predicated on the principle that the more flows and levels deviate from natural behaviour:

    a. the greater the risk of adverse environmental effects on aquatic ecosystems (for example, plants, invertebrates, and fish), and

    b. the greater the likelihood of other adverse effects such as, reduced levels of dissolved oxygen and higher water temperatures.

13. Similarly, the lower the minimum flow or level, and/or the greater the rate of take available for allocation from a water body, the greater the alteration to the water body's natural flow and level behaviour, and therefore, the greater the risk that instream habitat, ecosystem health, mahika kai, fishery amenity, and other relevant instream values will be adversely affected (Hayes, Shearer, & Casanovas, 2023).

14. There are water bodies in Otago where the total rate or volume of water that is taken or which is lawfully authorised to be taken by water permit holders results in a significant deviation from the natural flow and level behaviour. This presents a risk of adverse

environmental effects on instream habitat, ecosystem health, mahika kai, fishery amenity, and other relevant instream values. Furthermore, not all water bodies or water takes are subject to restrictions or limits under the current planning framework, and where restrictions and limits are set for water bodies, they do not necessarily provide an adequate level of protection for freshwater ecosystems.

1.2.2. The loss and degradation of water resources has resulted in material and cultural deprivation for Kāi Tahu ki Otago

15. Water plays a vital role in Kāi Tahu spiritual beliefs and cultural traditions. Kāi Tahu have an obligation through whakapapa to protect wai and all the life it supports. Whānau have observed the health of water degrade through time and consider it is crucial that this degradation is reversed. Many activities relating to water have had significant negative impacts on Kāi Tahu, including water takes and the changes to flow regimes as a result of damming. Specific concerns of Kāi Tahu relating to water allocation have been identified in the pORPS[1] and include:

    a. Many waterways in the region are over-allocated from a cultural perspective.

    b. Greater volumes of water are taken than are required, while there is a lack of water harvesting and continuation of inefficient methods of water use.

    c. Increased water demand for domestic use will put additional pressure on the water resources of the region.

    d. Long durations for water take consents lock in long-term patterns of resource use, (Macara, 2019)Cross mixing of water from different catchments has an adverse impact on the distinctive mauri of the water bodies.

    e. There is a lack of understanding of the interactions between groundwater and surface water.

16. The issues outlined above have an adverse impact on the mauri of the water and the habitats and species it supports, which leads to an adverse effect on mahika kai and taoka species and places.

1.2.3. Otago's waterbodies will be affected by climate change

17. Climate change is expected to impact both water demand and water availability in Otago due to the likely increased temperatures and potential for evapotranspiration, and changes in rainfall patterns. Otago temperatures are projected to increase, compared to 1995, by 0.6˚C to 0.9˚C in 2040 and by 0.6˚C to 2.8˚C by 2090, and the number of days with temperatures over 25˚C will likely increase (i.e., by 4 - 25 days per year) by 2090 (Macara, 2019). Snowfall is expected to significantly decrease, with shorter snow cover period (especially at lower elevations) and earlier spring melt that results in a change in seasonal river flow patterns (Macara, 2019).

18. In 2021, Tonkin and Taylor carried out a climate change assessment for Otago that identified the risks and opportunities posed to the natural environment, built environment,

[1] pORPS, RMIA – Resource management issues of significance to iwi authorities in the region, pg 94.

and economy (Tonkin and Tayler, 2021). This assessment identified risks for Otago water bodies and freshwater ecosystem from increasing temperatures and extreme weather events. Changes in precipitation patterns were anticipated to result in changes to flows and level for water bodies in Otago. For example, a decrease in summer rainfall in northern Otago is expected to contribute to the projected decrease in discharge for the rivers and lakes in this area. Increased annual dry days, temperature, and annual hot days may lead to increasing frequency and duration of drought conditions, particularly in summer in Northern Otago (Macara, 2019), and this is likely to lead to more lakes showing signs of thermal stratification. River flow volumes for most of Otago rivers are expected to increase, with the exception of the Taiari catchment and various North Otago catchments which are projected to show a decrease in discharge by up to 50% by 2090 (Macara, 2019).

19. Freshwater ecosystems across Otago are likely to experience more event scale disturbances (Tonkin and Tayler, 2021).[2] For example, an increase in severity of extreme storm events coupled with increasing rainfall for much of Otago may lead to more frequent and intense floods through the river systems. Risks were also identified to coastal, inland and alpine wetland ecosystems from drought, higher temperatures, changes in rainfall and reduced snow and ice. For example, climate change will likely affect the supply and seasonality of water, which could result in increased susceptibility to ongoing decline of wetland ecosystems.

20. Risks were identified to Otago water quality and quantity from changes in rainfall, higher temperatures, flooding, drought and reduced snow and ice. It is anticipated that such changes will impact water use in the region and have effects on the primary production sector, existing water supply infrastructure and electricity generation. Further to this, there were also risk identified to the above in relation to climate change hazards including changes in rainfall, extreme weather events and flooding (Tonkin and Tayler, 2021).

1.2.4. The take and use of water can have adverse effects on the health of water bodies and the ecosystem they support.

21. Freshwater is essential for human life. The ability to take and use freshwater as a resource is critical for the human health and well-being needs such as drinking water, but also for social, cultural, and economic wellbeing of society as a whole. The loss and degradation of water quantity and quality of water bodies poses a risk to the ability to take and use water in the future to provide for human health and well-being.

22. The social, cultural and economic well-being of Otago's communities depends on the use and development of natural and physical resources, but that use and development can compromise or conflict with the achievement of environmental outcomes.

23. Access to, and the ability to use, natural and physical resources can be impacted by regulatory changes, incompatible land uses, natural hazards and climate change. Equally, the use and development of the region's natural and physical resources can have adverse effects on the environment which need to be appropriately managed.[3]

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[2] The term "event scale disturbances" refers to disturbances at the scale of individual weather/natural hazard events (such as a storm event), and is used in contrast to slow onset gradual change (such as sea level rise etc).

[3] pORPS, SRMR–I10A

1.3. Status quo policy context (including operative plan provisions)

24. This section provides a description of the status quo from a policy perspective. It summarises the relevant national and regional policy direction and requirements in relation to setting environmental flows, levels and take limits, as well as outlining the provisions of the operative Water Plan.

1.3.1. National Policy Statement for Freshwater Management 2020 (NPSFM)

25. A range of requirements in the NPSFM for managing allocation and environmental flows and levels and take limits are directly relevant to this chapter.

26. Policy 11 of the NPSFM requires that freshwater is allocated and used efficiently, all existing over-allocation is phased out, and future over-allocation is avoided.

27. Clause 3.16(1) sets out the requirements for setting environmental flows and levels[4], and requires regional councils to:

include rules in its regional plan that set environmental flows and levels for each FMU, and may set different flows and levels for different parts of an FMU.

28. Clause 3.17 requires regional councils to identify take limits[5] for each FMU to meet the environmental flows and levels. The take limits are to be included as rules in the regional plan. Regional councils must state in their regional plan whether existing water permits will be reviewed to comply with environmental flows and levels, and if so, by when.

29. Clause 3.28 requires regional councils to include criteria in the regional plan for:

a. deciding applications for water permit transfers; and

b. deciding how to improve and maximise the efficient allocation of water (including economic, technical, and dynamic efficiency); and

c. methods in its regional plan to encourage the efficient use of water.

1.3.2. National Policy Statement for Renewable Electricity Generation 2011

30. The National Policy Statement for Renewable Electricity Generation 2011 (NPSREG) recognises the national significance of renewable energy generation by providing for the development, operation, maintenance and upgrading of new and existing renewable electricity generation activities. Of relevance to the take and use of water, Policy E2 requires regional plans to include objectives, policies and rules which provide for the development, operation, maintenance and upgrading of new and existing hydro-electricity activities. This includes provision for small and community-scale renewable electricity generation activities (Policy F).

31. However, the preamble to the NPSREG sets out its scope and states that "This national policy statement does not apply to the allocation and prioritisation of freshwater as these

[4] The flows and levels must be set to achieve the environmental outcomes for each FMU or part of FMU, and all relevant long-term visions. They may be set and adapted over time to take a phased approach.

[5] Under the NPSFM, Clause 1.4(1) take limit means a limit on the volume, rate, or both volume and rate, of water that can be taken or diverted from, or dammed in, an FMU or part of an FMU, as set under clause 3.17 [of the NPSFM]

are matters for regional councils to address in a catchment or regional context and may be subject to the development of national guidance in the future."

1.3.3. Proposed Otago Regional Policy Statement 2021

32. The following provisions of the pORPS are relevant to setting environmental flows, levels and take limits in the pLWRP.

33. Policy LF-FW-P7 provides direction for what environmental flows, levels and take limits are to achieve and specifies that they are to ensure:

    a. the health and well-being of water bodies and freshwater ecosystems is maintained or, if degraded, improved,

    b. the habitats of indigenous species with life stages dependent on water bodies are protected and sustained,

    c. the habitats of trout and salmon are protected insofar as this is consistent with (b),

    d. fish passage is provided for, except where it is desirable to prevent the passage of some fish species

    e. in order to protect desired fish species, their life stages, or their habitats,

    f. specified rivers and lakes are suitable for primary contact within the following timeframes:

        i. by 2030, 90% of rivers and 98% of lakes, and

        ii. by 2040, 95% of rivers and 100% of lakes, and

    g. resources harvested from water bodies including mahika kai and drinking water are safe for human consumption.

34. Policy LF-FW-P7A provides direction for water allocation and use that is relevant to setting flows, level and take limits. The policy states that, provided taking of fresh water is within limits and in accordance with any relevant environmental flows and levels, the benefits of using fresh water are recognised. The policy further requires that over-allocation is either phased out or avoided in by:

    a. allocating fresh water efficiently to support the social, economic, and cultural well-being of people and communities to the extent possible within limits, including for:

        i. community drinking water supplies,

        ii. maintaining generation output and capacity from existing renewable electricity generation schemes,

        iii. mana whenua customary or cultural needs and activities, and

        iv. primary production,

    b. providing for the harvesting and storage of fresh water to meet increasing demand for water, to manage water scarcity conditions and to provide resilience to the effects of climate change,

    c. providing for spatial and temporal sharing of allocated fresh water between uses and users where feasible.

35. Policy LF-FW-P13(3) requires the preservation of natural character and instream values of lakes and rivers and the natural character of their beds and margins by establishing environmental flow and level regimes and water quality standards that support the health and well-being of the water body.

36. Method LF-FW-M6 requires ORC to publicly notify a Land and Water Regional Plan and, after it is made operative, maintain that regional plan to:

    a. implement the required steps in the National Objectives Framework (NOF) process in accordance with the NPSFM,

    b. identify water bodies that are over-allocated and the methods and timeframes for phasing out that over-allocation (including through environmental flows and levels and limits) within the timeframes required to achieve the relevant long-term vision,[6]

    c. provide for the allocation and use of fresh water in accordance with LF-FW-P7A, including by providing for off-stream water storage.

1.3.4. Regional planning framework (operative Water Plan)

1.3.4.1. Overview of Regional Water Plan

37. The Water Plan contains provisions that manage the use, development and protection of Otago's freshwater resources. Since the Water Plan became operative on 1 January 2004 there have been several plan changes of relevance which established flow, level and allocation regimes for a limited number of catchments and aquifers.

38. Regional plan provisions managing environmental flows, levels and take limits are contained within multiple chapters of the Water Plan. The most relevant chapters for this topic are:

    Chapter 4 (Kāi Tahu ki Otago water perspective)

    Chapter 5 (Natural and human use values of lakes and rivers)

    Chapter 6 (Water quantity)

    Chapter 12 (Rules: Water Take, use and Management).

39. Chapter 4 outlines Kāi Tahu values and aspirations for freshwater in Otago. Kāi Tahu's objective with respect to the management of Otago's water resource is to ensure consistency with the values of Kai Tāhu whanui and to be involved in that management.

40. Chapter 5 sets out the issues, objectives and policies for activities that can affect natural and human use values of lakes and rivers, including the taking of water.

41. Chapter 6 provides the policy framework for managing water quantity. The policies in chapter 6 direct how surface water and connected groundwater will be managed to achieve the objectives, and outline how resources will be quantified and allocated, including by establishing limits, restrictions, and flows and levels.

42. Chapter 12 provides the rule framework for the take and use of water.

[6] pORPS, LF-FW – Fresh water

43. The following schedules are also relevant to water quantity management:

a. Schedule 1B: Schedule of water supply values

b. Schedule 2A - 2D: Specified restrictions on the exercise of permits to take surface water.

c. Schedule 3A-3B: Human use values of Otago's aquifers

d. Schedule 4A-4D: Allocation and restriction regime for groundwater.

e. Schedule 5A-5B: Limits to instantaneous take of groundwater.

1.3.4.2. Environmental flows, levels and limits

44. The Water Plan sets flows, levels and allocation regimes for some but not all waterbodies in Otago and the provision themselves do not use the terminology of the NPSFM such as "take limit." The Water Plan sets "allocation limits" which define the maximum flow or quantity of water in a water body available to take.[7] Allocations limits are set for different water bodies according to different provisions of the Water Plan.

45. The Water Plan sets flows, levels and allocation regimes for some but not all waterbodies in Otago and the provision themselves to not use the terminology of the NPSFM such as "take limit." The Water Plan sets "allocation limits" which define the maximum flow or quantity of water in a water body available to take. Allocations limits are set for different water bodies according to different provisions of the Water Plan.

1.3.4.3. Rivers

46. Allocation limits for rivers are set based on an instantaneous rate of take and the limits that apply to water permits for takes with the highest reliability of supply and which are subject to the lowest minimum flows are referred to as "primary" allocation limits.

47. The Water Plan also sets "Supplementary" allocation limits (called "supplementary allocation blocks") and supplementary allocation minimum flows for the taking of water from rivers during higher flow periods (often for the purpose of flow harvesting to supply storage reservoirs). Table 1 summarises the relevant primary and supplementary allocation provisions.

Table 1: Flows, levels and take limits for rivers (including flows and limits for rivers during high flow periods)

Primary allocation	
Take limits	**Flows and/or levels**

Policy 6.4.2 sets "primary" allocation limits for rivers (and connected groundwater) as the greater of:
• "Bespoke" limits set for the 14 catchments listed in Schedule 2A, or
• For catchments not listed in Schedule 2A:
  ○ 50% of the 7DMALF, or
	The Water Plans sets minimum and residual flows as follows:
	• "Bespoke" minimum flows are specified in Schedule 2A, or
	• For catchments not listed in Schedule 2A:
	  ○ No minimum flow are specified, or

[7] Allocation limits in the Water Plan are effect are the same as take limits under the NPSFM, as they set the maximum or volume rate of water that can be allocated and therefore taken from a water body.

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- The sum of consented takes.

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- Minimum flows are set on a consent-by-consent basis, or
- "Residual flows"[8] are set on individual consents (water that must be left in the river at the point of take)
- Minimum flows do not apply to community supply takes identified in Schedule 1B.

</td></tr>
<tr><td colspan="2">Supplementary and further supplementary allocation</td></tr>
<tr><td>Take limits</td><td>Flows and/or levels</td></tr>
<tr><td>

Policy 6.4.9 sets "supplementary" allocation limits for rivers as either:

- "Bespoke" limits set for the 8 catchments in Schedule 2B, or
- "Default" limits for catchments not listed in Schedule 2B, based on a prescribed method.
- Method 15.8.1A.1 sets "supplementary allocation blocks" as follows:

<table>
<tr><th>7 day mean annual low flow (litres per second)</th><th>Supplementary allocation block (litres per second)</th></tr>
<tr><td>< 10</td><td>50</td></tr>
<tr><td>10 – 299</td><td>100</td></tr>
<tr><td>300 – 999</td><td>250</td></tr>
<tr><td>> 1000</td><td>500</td></tr>
</table>

Policy 6.4.10 of the Water Plan also provides for "further supplementary" allocation which allows for the taking of water without any restriction on the volume taken, where the flow is at or above natural mean flow.

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Supplementary minimum flows

Policy 6.4.9 sets out three pathways for determining supplementary minimum flows:

- The minimum flow specified in Schedule 2B, or
- For catchments not listed in Schedule 2B, supplementary minimum flows can be set either:
- Based on a formula for calculating the supplementary minimum flow based on the 50% flow sharing regime;[9] or
- On an alternative basis, provided:
  - The take has no measurable effect on the flow at a monitoring site at flows at or below any primary allocation minimum flow; and
  - Any adverse effect on any aquatic ecosystem value or natural character is no more than minor; and
  - There is no adverse effect on any lawful existing take.

Further supplementary minimum flows

The minimum flow for the taking of water as further supplementary allocation is set at or above natural mean flow.

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[8] Residual flows are set under policy 6.4.7 to provide for the aquatic ecosystem and natural character of the source water body. Residual flows typically apply to community water supplies and takes from tributaries that have different flow characteristics from the main stem under low flow conditions.

[9] The explanation to Policy 6.4.2 includes the following formula for determining supplementary minimum flows: *Assessed actual take + supplementary allocation(s) = supplementary minimum flow* Or, if actual take cannot be calculated: *Primary allocation + Supplementary allocation(s) = Supplementary minimum flow*

1.3.4.4. Lakes

48. The Water Plan currently contains only a few provisions that limit or restrict water takes from lakes in Otago or that can be considered environmental levels and take limits. In many instances the degree to which the plan manages the taking of water from lakes as part of the framework for managing takes from river catchments. Table 2 provides an overview of the Water Plan provisions that set environmental levels and take limits for lakes.

Table 2: Flows, levels and take limits for lakes.

Take limits	Flows and/or levels
• The Water Plan only sets bespoke take limits for the Lake Hayes and Lake Tuakitoto catchments in Schedule 2A. • The Plan does not set default take limits for any other lakes in the Otago region (although some lakes are subject to the take limits that apply to the wider catchment of which these lakes are part of).	• Except for the minimum level established for Lake Tuakitoto (under Policy 6.5.1, the Water Plan does not include any specific environmental levels for lakes. • However, takes from some lakes are subject to the Schedule 2A minimum flows that applies to connected surface water bodies (For example, takes from Lake Tuakitoto are subject to the minimum flow for Lovells Creek, while taking from Lake Hayes must cease when flows are at or below the minimum flow set for Mill Creek).

1.3.4.5. Groundwater

49. The Water Plan sets "maximum allocation limits" for the region's known aquifers and these limits are typically set as a total volume per year that is available for allocation. In addition, the Water Plan also sets environmental flows and levels, with the latter referred to in the plan as *aquifer restriction levels,* for a small number of aquifers in Otago.

Table 3: Environmental flows, levels and take limits for groundwater.

Take limits	Flows and/or levels
• Policy 6.4.10A2 of the Water Plan sets "maximum allocation limits" for aquifers as follows: • "Bespoke" limits for the five aquifers in Schedule 4A; and • "Default" limits for aquifers not included in Schedule 4A, based on 50% of the mean annual recharge calculated under Schedule 4D. • Policy 6.4.1A further stipulates that any groundwater take from any alluvial aquifer in	• Groundwater restriction levels, established under Policy 6.4.10A1 are specified for five other aquifers in Schedule 4B. • Groundwater takes from any alluvial aquifer in Schedule 2C are considered and allocated as surface water takes and subject to any relevant limits and flows.

Schedule 2C is allocated as surface water and subject to the take limits that apply to the catchment.	

1.3.5. Issues with the Water Plan

50. There are several issues with the Water plan in relation to the setting of environmental flows, levels and take limits rivers, lakes and groundwater. Some bespoke and default flows, level and allocation limits set for water bodies in the Water Plan allow significant levels of water take to occur which poses risks of adverse effects to freshwater values. Further to this, the current planning framework does not implement the requirements of the higher order planning instruments.

51. In particular:

    a. The water plan does not set environmental flows, level and take limits for all water bodies.

    b. Where there are Environmental flows, level and limits in in the Water plan they do not always adequately protect freshwater values or give effect to higher order planning instruments.

1.3.5.1. The water plan does not set environmental flows, level and take limits for all water bodies

52. The relevant objectives, policies and rules in the Water Plan provide a basic, incomplete, and out-of-date framework for setting environmental flows, levels and take limits for water bodies in light of the direction from higher order planning instruments. As described above, the Water Plan sets bespoke minimum flows, levels and allocation limits for only a limited number of catchments and aquifers. In addition, the Water Plan also sets default take limits for many other rivers and only for some known aquifers in the region.

53. There are water levels set for lakes associated with the Clutha hydro scheme which have been set through the consenting process for the scheme and its operation. However, there are no allocation limits and minimum flows or levels set in the Water Plan for lakes Dunstan, Hāwea, Roxburgh, Wānaka, or Whakatipu-Waimāori/Lake Wakatipu or the main stems of the Mata-Au Clutha River or Kawarau River, which together constitute the region's largest freshwater resource.

1.3.5.2. Environmental Flows, level and limits in the Water plan do not adequately protect freshwater values or give effect to higher order planning instruments

54. Although the Water Plan sets bespoke and default minimum flows, levels, and allocation limits for freshwater bodies these flows, levels, and limits do not always provide an adequate level of protection for freshwater values from the adverse effects of water abstraction. For example, the default allocation method for rivers in the Water Plan, which sets a default take limit as 50% of MALF, allows for abstraction to occur on a scale that is much greater than what is recommended in relevant guidelines for limit setting (add a few references to these guidelines). As a result, the allocation methods in the plan do not set precautionary take limits that prevent environmental effects on instream ecology and

other freshwater values (e.g. cultural values, recreational values and natural character values) from occurring.

55. Modelling that was undertaken for catchments where the pLWRP seeks to set bespoke allocation and/or flow regimes indicates that the current water quantity management regimes established under the operative Water Plan pose medium or high risk to ecological values (Auspurger, Olsen, & and Dyer, 2024). These catchments include the Manuherekia (Allibone, 2021; Dyer, 2023; Boffa Miskell Limited, 2023b), Cardrona (Ravenscroft, Xiaofeng, Mohssen, Augspurger, & Olsen, 2017), Kākaunui (Olsen D. , 2023a), Low burn (Olsen D. , 2023b), Waianakarua (Olsen D. , 2024a), Shag River/Waihemo (Olsen D. , 2024b), Luggate (Olsen D. , 2024c) and Waikouaiti (Olsen D. , 2023d).

56. Further to this, the Water Plan's default method for managing supplementary allocation regime is based on a 50 percent flow sharing regime which allows for a high degree of flow modification, particularly in tributaries. In addition, the framework for setting supplementary allocation blocks and associated minimum flows is based on the hydrology of the main stem and therefore does not adequately consider the potential effects of a supplementary taking on the unique hydrological and ecological characteristics of individual tributaries or when setting residual flows for supplementary takes. The "default" method allows for more modification than is considered to provide a high level of protection for in stream values (Hayes, Shearer, & Casanovas, 2023).

57. Finally, the Water Plan also allocates water at flows above mean flow as "further supplementary" allocation. The framework for further supplementary allocation provides for the allocation of water above mean flow without any restriction on the volume taken. This aspect of the Water Plan's framework for managing water quantity fails to provide for the health and wellbeing of rivers by not considering the positive impacts of flushing sediments on geomorphology and reducing periphyton biomass at flows above mean flow (Olsen D. , 2023g).

58. Similar issues arise with respect to the management of groundwater under the operative Water Plan. The framework for setting default allocation limits for aquifers that are not included in Schedule 4A is based on 50% of the mean annual recharge. This allocation regime is permissive compared to groundwater management regimes applied in other regions where a maximum limit of 35 % is more common (KSL, 2020).[10] This suggests the Water Plan's framework may pose risks to the long-term sustainable management of these aquifers and any connected water bodies. Finally, there is also no framework in the Water Plan for setting take limits for unmapped aquifers such as fractured rock aquifers (Yeo S. , 2023).

59. Given that there are currently only a limited number of technical studies for aquifers in Otago and that uncertainties remain with respect to the hydrological characteristics of many other aquifers, the default limits for managing groundwater are considered too permissive and inconsistent with the goal of safeguarding groundwater resources and the diverse values they support (including any established uses).

[10] For example, the maximum allocation limit is 35 % of mean annual recharger (or a similar recharge statistic) in Northland, Auckland, Bay of Plenty, Southland.

60. Given the risks described above, environmental flows, levels and limits set in the Water Plan may not always give effect to the NPSFM, and in particular Te Mana o te Wai.

1.4. Objectives

61. Section 32(1)(b) requires an examination of whether the provisions in a proposal are the most appropriate way to achieve the objectives. The objectives relevant for this topic are:

a. All of the objectives in the IM – Integrated management chapter, and

b. All of the environmental outcomes included as objectives in chapters FMU1 to FMU5 (including chapters CAT1 to CAT5); and

c. EFL-O1 - Efficiency

1.5. Discounted options

62. This section provides a brief discussion on options for setting environmental flow, levels and take limits that were discounted.

1.5.1. Setting bespoke environmental flows, levels and take limits for all water bodies

63. Setting bespoke environmental flows and levels and take limits for all of the region's water bodies is a discounted option.

64. This option would set bespoke environmental flows, levels and take limits for 100's of identified catchments and sub-catchments, over 60 mapped aquifers, and 1000's of lakes varying in size and scale in Otago. Pursuing this approach requires a considerable amount of information on each individual water body, such as hydrological data and ecological information, that is not currently available. Further to this, most water bodies in Otago are currently subject to a high demand for water. For these reasons, the approach of bespoke environmental flows and levels and take limits for all of the region's water bodies is considered unnecessary and not reasonably practicable. Therefore, this option was discounted.

1.5.2. Regionwide approach to allocating specified quantities of water to different uses

65. Setting specific take limits for water bodies at a regionwide scale that allocates specified quantities of water to different types of water uses is a discounted option.

66. This option creates a complex planning framework that is impractical to implement. For example, most single water takes often supply water for a combination of end-uses, and many water bodies in Otago have no or little water demand for certain uses. Therefore, the development of a regionwide approach to set separate take limits for allocating water to different uses was not considered a reasonably practicable option and was therefore discounted.

1.6. Summary of proposal for setting environmental flows, levels and take limits in EFL chapter

67. The proposal sets environmental flows and levels and take limits for rivers, lakes and aquifers in Otago according to different allocation methods. This section provides a

summary of the methods and the rationale behind this approach, prior to the evaluation of the options in later sections.

1.6.1. Rivers

1.6.1.1. Determining the appropriate allocation method to apply to rivers in Otago

68. ORC developed an allocation model to determine the most appropriate method for setting environmental flows and take limits for different river in Otago (Friedal, Stewart, Lu, Stevenson, & and Dyer, 2023).

69. A default method for setting "primary allocation" takes limits and minimum flows as recommended by (Hayes, Booker, Singh, & and Franklin, 2021) (hereafter referred to as the 'Hayes method') for the rivers of Otago was applied to all catchments[11] that either flow directly into the sea, or flow into the Clutha Mata-au mainstem.[12] As the Hayes method should only be applied to set default takes limits and minimum flows for rivers that have limited hydrological modification, the method was used as a filter to categorise rivers where this method is able to apply. This process is outlined in more detail below.

70. First, the sum of the current consented allocation in each river catchment was calculated. The sum of the current consented allocation for each of these catchments was then compared to the default take limit recommended by the Hayes method and determined using naturalised flow statistics.

71. Catchments where the sum of the current consented allocation did not exceed the take limit generated by the Hayes method were considered to have limited hydrological modification. Of the 317 catchments assessed within the model, 269 catchments showed to have a limited degree of hydrological modification. For these catchments the Hayes method was considered an appropriate default method for setting environmental flows and take limits in the pLWRP.

72. The remaining 46 catchments where the sum of the current consented allocation exceeded the take limit generated were considered to have a moderate to high degree of hydrological modification. Therefore, the Hayes method is not considered appropriate for setting environmental flows and take limits in these catchments.

73. Following further investigation, the 48 river catchments were identified where the default method for setting environmental flows and take limits is not appropriate. These catchments fall into two categories:

    a. River catchments with higher hydrological modification and with sufficient information available to inform the setting of bespoke take limits and minimum flows in the pLWRP prior to notification; and

[11] The model included most catchments of Strahler 1 to 3, but also include catchments ranging from stream order 1 to 7.

[12] The Clutha Mata-au main stem includes the Clutha Matau-au river from Lake Wanaka Outlet to the Mouth, Hawea River from Lake Hawea Dam Outlet to the Confluence with Clutha Mata-au, Kawarau River from outlet of Lake Whakatipu to the Confluence with Clutha Mata-au arm of Lake Dunstan, and for the purposes of the allocation model Lakes Wanaka, Wakaipu and Hawea.

b. River catchments with varying degrees of hydrological modification, often a small number of consented takes, and insufficient information available to set bespoke take limits and minimum flows prior to the notification of the pLWRP.

74. For the first category of river catchments, technical reports based on available scientific information were prepared. These reports informed the setting of bespoke take limits and environmental flows that will support the achievement of relevant FMU environmental outcomes.

75. For the second category of river catchments, where there is currently insufficient information available to set bespoke take limits and minimum flows prior to the notification of the pLWRP, the following interim take limits and minimum flows are proposed:

a. The take limit: set as the sum of all consented primary allocation at the time of notification of the pLWRP.

b. The interim minimum flow: set according to the default method for setting environmental flows, and implemented during the resource consent replacement process, with an option for water permit holders to propose an alternative minimum flow that achieves the relevant FMU environmental outcomes.

76. However, prior to the commencement of the resource consent replacement process that implements the proposed interim minimum flow regime, ORC will undertake a further assessment to determine whether there is a need to set bespoke minimum flows and take limits for these rivers through a plan change process.

77. Figure 1 illustrates the process of filtering the river catchment to determine the appropriate method.

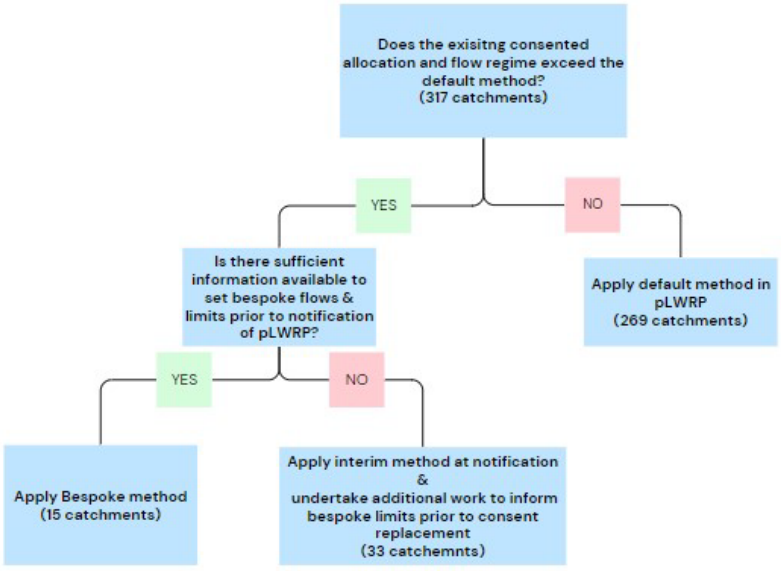


Figure 1: filtering of river catchment categories

78. Table 4 summarises the proposal for setting environmental flows and take limits for all river catchments in Otago according to the following categories:

Table 4: River categories and allocation methods proposed in pLWRP.

River category	Description of allocation method
Category 1: Default	• For rivers with low hydrological modification default minimum flows and take limits will be set based on a percentage of the 7-day mean annual low flow *(7DMALF*).[13] • This method applies to most rivers in Otago. • See Part 5 of SCHED3 – Rivers: A Block environmental flows, levels and take limits of the pLWRP
Category 2: Bespoke	• For rivers with higher hydrological modification and sufficient information available bespoke take limits and minimum flows will be set based on site specific information. • See Part 1 and Part 3 of SCHED3 – Rivers: A Block environmental flows, levels and take limits of the pLWRP

Category 3: Interim	• For rivers with:
	  • a moderate to high hydrological modification,
	  • often a small number of consented takes and/or
	  • long-term consents, and
	  • insufficient site-specific information available to set bespoke take limits and minimum flows prior to notification of the pLWRP.
	• For these rivers interim take limits and minimum flows will be set. These will be implemented through the resource consent replacement and plan change processes.
	• See Part 3 and Part 4 of SCHED3 – Rivers: A Block environmental flows, levels and take limits of the pLWRP

1.6.2. Lakes

1.6.2.1. Determining lake categories in Otago for setting environmental levels and take limits

79. Given the broad definition of the term lake under the RMA,[14] and the diversity of lakes in Otago and their associated values, the proposal creates a management framework that distinguishes different categories of lakes for the purpose of setting environmental levels and take limits. The categories include:

[13] As defined in the pLWRP "7-day mean annual low flow (7DMALF)" means the average, for a minimum of five years of the lowest average flow over seven consecutive days in each year. The lowest average flow over seven consecutive days in each year is determined by calculating the average flow over seven consecutive days for every seven consecutive day period in the year and choosing the lowest.

[14] Under section 2 of the RMA **lake** means a body of fresh water which is entirely or nearly surrounded by land

a. Off-stream artificial lakes: which means a body of water created by artificial means including by an off-stream dam,

b. Controlled lakes: which means a lake where the outflow of the lake is controlled by artificial means,

c. Natural lakes: which means a lake that is not a controlled lake or an off-stream artificial lake.

80. Table 109 summarises the proposal to set environmental levels and take limits for the different lake categories.

Table 5: Lake categories and allocation methods proposed in pLWRP.

Lake category	Description of allocation method
Natural lakes	Environmental levels and take limits are set as either: Bespoke levels and limits for specific natural lakes. See Part 1 of SCHED5 – Lakes: Environmental levels and take limits. Default 'narrative' levels and limits set for lakes where there are no bespoke level or limits specified.
Controlled lakes	Controlled lake levels managed by existing consent conditions that are to be set in the plan. See Part 2 of SCHED5 – Lakes Environmental levels and take limits
Off-stream artificial lakes	Provided there is no hydrological connection with any water body, there are no applicable levels or take limits. See Part 3 of SCHED5 – Lakes: Environmental levels and take limits

1.6.3. Aquifers

81. Determining the appropriate allocation method for setting environmental flows (where relevant) and levels and take limits for aquifers, as with setting limits for rivers, necessitates an assessment of the level of information available on Otago's aquifers. The level of information available, much like the characteristics and hydrology of Otago's aquifers, varies. For the purposes of setting environmental flows, levels and take limits, aquifers in Otago can be categorised as follows:

a. Bespoke aquifers: mapped aquifers (17 in total) with detailed technical information available to inform setting environmental levels and take limits prior to notification of pLWRP,

b. Default aquifers: mapped aquifers (31 in total) with insufficient technical information available to inform the setting of bespoke environmental levels and take limits prior to notification of pLWRP,

c. Alluvial ribbon aquifers: Mapped alluvial aquifers (12 in total) with detailed technical information available on their hydrological connection with surface water bodies.

d. Unidentified and unmapped aquifers: aquifers that have not been identified or mapped.

82. Figure 2 below illustrates how these categories of aquifer and the appropriate allocation method have been determined.

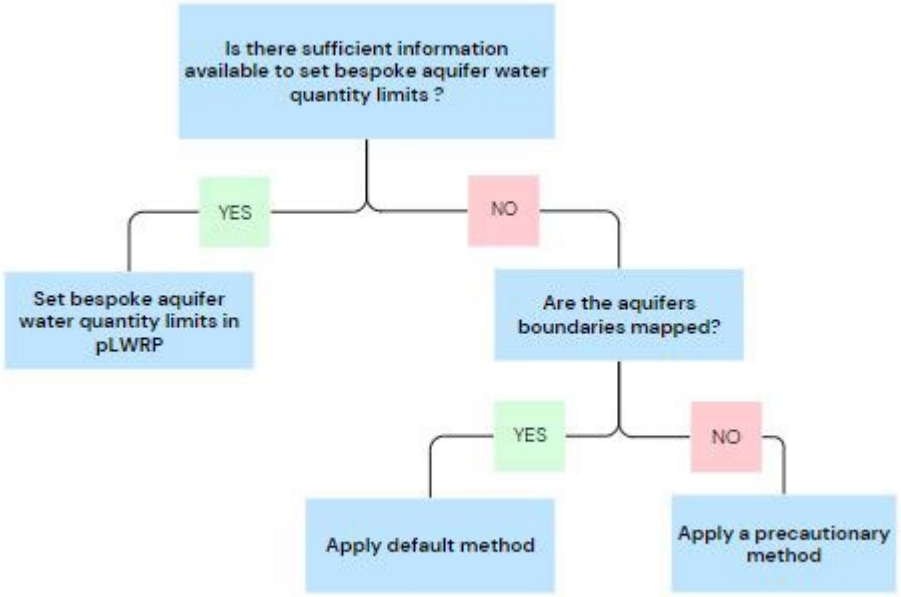


Figure 2: Aquifer categories and allocation methods proposed in pLWRP.

83. Table 6 summaries the proposal to sets environmental flows, levels and take limits for the different categories of aquifer.

Table 6: Aquifer categories and allocation methods proposed in pLWRP.

Aquifer category	**Description of allocation method**
Bespoke aquifers	• Bespoke take limits for specified aquifers • See Part 1 of SCHED6– Groundwater
Default aquifer	• Either a default take limit of no more than 35% of mean annual recharge, (see Part 3 of SCHED6– Groundwater) or • An interim default take limit set as sum of all consented take at notification of pLWRP where the total consented allocation from an aquifer exceeds 35 percent of mean annual recharge. • See Part 4 of SCHED6– Groundwater: Take limits
Alluvial ribbon aquifers	• Subject to any environmental flows and take limits of the river they are hydraulically connected to. See Part 2 of SCHED6– Groundwater Take limits
Unidentified and unmapped aquifers	• A default take limit of no more than 5% of the estimated annual average rainfall accumulation on the relevant landholding

1.7. Sub-topic: Rivers

84. This section evaluates the reasonably practicable options identified for setting default environmental flows, levels and take limits for rivers in Otago. As discussed above, the overall approach is to set minimum flows and take limits for most rivers in Otago based on a default allocation method, and to set bespoke minimum flows and take limits for rivers that are not subject to the default method.

85. As discussed above, for river catchments with sufficient technical information available and/or high levels of total consented allocation the pLWRP proposes bespoke allocation regimes. The NPSFM requires the setting of environmental flows, levels and take limits to support the achievement of environmental outcomes set for each FMU as part of the NOF process in the NPSFM.

86. The EFL chapter and part 1 and Part 2 of SCHED3 – Rivers: A Block environmental flows, levels and takes limits propose bespoke take limits and minimum flows for the 16 river catchments. The proposed flows and take limits for each catchment are based on the best available information. For example, see Todd, (2024); SLWP (2024a); SLWP, (2024b) for catchments in Dunstan rohe; SLWRP (2024c) for Waikouaiti River); SLWP, (2024d); SLWP, (2024e); SLWP, (2024f) for catchments in North Otago.The proposed bespoke limits for rivers have been set to give effects to the NOF process and the aspirations of the wider community and mana whenua. Given that the setting of bespoke limits in accordance with the NOF is required by higher order planning instruments, this section does not evaluate options for different minimum flows and take limits for each bespoke river catchment. These have been set at rates considered to achieve the environmental outcomes relevant to the individual river catchment. However, there will be an evaluation of the options for implementing the proposed bespoke minimum flows and takes limits in section 2 of this chapter.

87. The EFL chapter and Part 4 of SCHED3 – Rivers: A Block environmental flows, levels and take limits also proposes Interim bespoke take limits and minimum flows for 35 river catchments. The proposed interim limits allow for catchment-specific responses to support achieving environmental outcomes over time, while recognising the specific circumstances of each river. A long-term solution for setting limits in these river catchments is proposed depending on the circumstances of the individual river catchment. This may include implementation through either a plan change process for the larger more complex catchment within this category, and/or the consent renewal and consent review process for the smaller river catchments with a small number of existing water permits within this category.

88. Given that setting bespoke environmental flows and take limits for all rivers in Otago is not a reasonably practicable option, an appropriate default allocation method that will achieve relevant objectives is required for rivers where current consented allocation is low and where bespoke limits cannot be set prior to notification of the pLWRP due to the absence of detailed water body specific studies. The current planning framework for setting default limits for rivers in the Water Plan is a discounted option as it does not give effect to higher order planning instruments.

1.7.1. Reasonably practicable options

89. Three reasonably practicable options were identified for setting default minimum flows and take limits for rivers to achieve the objectives relevant to the EFL chapter:

a. **Option 1**: Default method based on recommendations by Hayes et al. 2021 (preferred option)

b. **Option 2**: Default method based on 2008 proposed NES on Ecological Flows and Water Levels

c. **Option 3**: Set different default river categories

1.7.1.1. Option 1: Default method based on recommendations by Hayes et al. 2021m (preferred option)

90. Option 1 proposes to set default take limits and minimum flows based on the Hayes method (Hayes, Booker, Singh, & and Franklin, 2021) for all river catchments for which it is not practicable to set bespoke minimum flows and take limits.

91. The take limits set under this method are referred to as the "A bock" take limit in the EFL chapter and are the equivalent of what is referred to as a "primary allocation limit" in the Water Plan.

92. The default minimum flows and take limits proposed by this option are demonstrated in Table 7.

Table 7: proposed default minimum flows and take limits under option 1.

River size	Minimum flow	Take limit
Surface water body with mean flow ≤ 5 m^3/s	90% of naturalised 7-day MALF	20% of naturalised 7-day MALF
Surface water body with mean flow > 5 m^3/s	80% of naturalised 7-day MALF	30% of naturalised 7-day MALF

93. According to the Hayes method these proposed default minimum flows and take limits can combine to serve several functions that are consistent with objectives relevant to the EFL chapter, namely:

a. Protection against more than minor effects on instream values arising from future flow regime alterations in the absence of detailed studies on flow-instream value responses,

b. Provision of moderate support for out of stream values by allowing relatively low levels of water abstraction without significant consenting costs or risks to instream values,

c. Acting as a reference for assessing the degree of hydrological alteration that current consents or proposed water resource use limits represent, including an indication of the risk of more than minor effects on instream habitat, ecosystem health and other instream values in the absence of detailed studies on these responses.

1.7.1.2. Option 2: Default method based on limits recommended in the draft proposed 2008 NES on Ecological Flows and Water Levels

94. Option 2 proposes to adopt the interim default minimum flow and take limits recommended in the draft proposed 2008 NES on Ecological Flows and Water Levels.[15] This default method would also only apply to river catchments that are not subject to bespoke environmental flows and take limits.

95. The proposed default minimum flows and take limits under this option are demonstrated in Table 8.

Table 8: Proposed default minimum flows and take limits under option 2.

River size	Minimum flow	Take limit
Surface water body with mean flow ≤ 5 m^3/s	90% of naturalised 7-day MALF	30% of naturalised 7-day MALF
Surface water body with mean flow > 5 m^3/s	80% of naturalised 7-day MALF	50% of naturalised 7-day MALF

1.7.1.3. Option 3: Default method that sets different categories of river

96. Option 3 proposes to set minimum flows and take limits based on a default method that sets different limits according to river categories based on size as well as having a category for rivers identified as outstanding water bodies. This default method will also only apply to all river catchments that are not subject to bespoke environmental flows and take limits.[16]

97. The proposed default minimum flows and take limits under this option are demonstrate in table 113.

Table 9: proposed default minimum flow and take limits under option 3.

River category	Minimum flow	Take limit
Outstanding	100% of naturalised 7-day MALF	10% of naturalised 7-day MALF
Small (≤ 5 m^3/s)	90% of naturalised 7-day MALF	20% of naturalised 7-day MALF
Medium (5 m^3/s to 20 m^3/s)	80% of naturalised 7-day MALF	30% of naturalised 7-day MALF
Large (> 20 m^3/s)	80% of naturalised 7-day	50% of naturalised 7-day

[15] In 2008 the Ministry for the Environment (MfE) published two documents, the Proposed National Environmental Standard on Ecological Flows and Water Levels discussion document (Proposed NES) (MfE 2008) and the Draft Guidelines for the Selection of Methods to Determine Ecological Flows and Water Levels (Becca 2008). The intent of the proposed NES was to set interim default limits for rivers, lakes and aquifers while councils applied the technical guidance on methods for setting flow and level limits at a catchment or aquifer scale in regional plans. The expectation was that eventually interim limits would be replaced by those set using the methods in the Becca (2008) report. Since the draft proposed NES was released it has not been implemented by central government.

[16] This option is largely adapted from an option for setting default minimum flows and allocation limit that was evaluated in the Section 32 analysis report for the Proposed Regional Plan for Northland September 2017.

	MALF	MALF

1.7.2. Community feedback

98. A summary of draft provisions based on option 1 were presented during the third round of community engagement. There was mixed response both in support and opposition to the proposed default method for setting take limits and minimum flows. The precautionary approach to setting limits was supported by many. Conversely, some considered the default limits to be too restrictive and expressed a view that maintaining the status quo is appropriate. Additionally, there were some that considered the proposal too permissive and not convective enough given the uncertainty on the impacts of climate change.

99. There was also a mixed response to many of the proposed bespoke river minimum flows and take limits, in particular the Manuherekia catchment. Similar to the default method, many consider the proposal to be either too strict on existing water users or too permissive and not providing adequate environmental protection. There was also opposition to the proposed timeframe for implementing minimum flows, most notably for the Manuherekia catchment. For some the timeframes were considered too onerous and not providing sufficient time for existing water users to adapt and take the necessary action to reduce the impacts of the proposal. Conversely, for others the proposed staging of minimum flows was considered too delayed and not providing the appropriate level of environmental protection.

100. In response to the mixed feedback, the overall approach was largely retained as the proposed default and bespoke limits and flows are considered to protect freshwater values and to give effect to the relevant higher order planning instruments. However, the draft provision that set flows and limits for rivers was amended following community and stakeholder engagement to make the proposal clearer.

1.7.3. Clause 3 consultation

101. Draft provisions based on Option 1 were presented during clause 3 consultation. The responses received from clause 3 parties on the proposal were mixed and can be summarized as follows:

a. Some parties oppose the ability to set alternative minimum flows, site specific (residual) flows and take limits through the consent process and prefer that these are set in the plan.

b. Some parties oppose the setting of interim take limits based on consented allocation.

c. Some parties oppose default take limits and flows for catchments where catchment specific information is not available, whereas others supported the conservative method.

d. Some parties considered the default method to be too conservative and others considered that the method was not effects-based.

102. The feedback received from iwi authorities during the clause 3 consultation included concern in relation to the consideration outlined in the policy framework that supports the setting of the environmental flows and take limits for rivers and the consistency of the

approach within the EFL chapter and with other relevant chapters. For example, references to natural form and function.

103. In response to the feedback received by clause 3 parties including iwi authorities, the proposed provisions were amended to provide clearer direction for the setting of environmental flows, levels and take limits for rivers in Otago. While there was a mix of views in support and opposition to the proposed default method, the method in option 1 was retained as this is considered consistent with achieving the environmental outcomes set for water bodies in all FMU and rohe.

1.7.4. Clause 4A consultation

104. Feedback received by Iwi authorities during the clause 4A consultation included:

a. Opposition to the proposed interim environmental flows and limits and the policy framework (discussed above in the summary of the proposal) which allow for changes to be made through the consenting process.

b. There was concern expressed on how an environmental flow or limit could be altered without a requirement for a plan change, and concern that a consent process would not provide for the level of information and engagement required by the NOF process when setting flows and limits.

c. That despite changes made to clarify the policy framework post clause 3 consultation, that the proposed policy framework does not provide a clear line of sight to how these proposed limits will achieve the environmental outcomes.

105. Environmental flows and take limits that are set in the plan cannot be changed through the consent process. In response to the feedback received, amendments were made to make it clearer that that the minimum flows will not be reset in the plan, but that the policy provides the option to apply a different minimum flow to a consent.

1.7.5. Effectiveness and efficiency assessment

106. Section 32(2)(c) of the RMA requires ORC to take into account the risk of acting or not acting if there is uncertain or insufficient information. There is uncertain and insufficient information available on the hydrology of many of Otago's river catchments. Setting minimum flows and take limits for rivers based on a default method is required to minimise the risk of more than minor effects on instream freshwater values arising from take and use of water. The proposed default methods are implemented based on the best available information including observed and modelled hydrology and flow statistics for most of the river catchments in Otago.

107. Table 10 below identifies and assesses the environmental, cultural, social, and economic benefits and costs anticipated from implementing the options proposed above.

Table 10: Benefits and costs of proposed options for default allocation methods for rivers in EFL chapter.

	BENEFITS	COSTS
Option 1: Hayes method (preferred option)	• Provides a high level of protection for rivers and the ecosystems they support from the adverse effects of water takes, in the absence of detailed	• Compared to option 2 and 3, Reduces potential availability and reliability of water supply for any future taking of water from rivers.

	BENEFITS	COSTS
	river catchment studies (Hayes, Booker, Singh, & and Franklin, 2021). • Provides a high level of protection for instream values, including threatened species, taoka and mahi kai species (Timms-Dean, McIntyre, Duncan, & Moran, 2024) • Safeguards the freshwater resource, avoids over-allocation in relation to water quantity, and manages the uncertainty in relation to the effects of climate change on river hydrology and water availability by setting conservative flows and limits. • Provides a relatively clear and simple allocation regime for most rivers in Otago with lower costs associated with administering and implementing the method (compared to option 3). • Does not impact any existing water users in river catchments subject to default take limits and minimum flows. • Provides for future water use in river catchments where the default method is applied, which may have associated economic benefits for future water users and the wider community. For example, water is available to support the productive uses such as community water supply or primary production. • The default method proposed in option 1 alongside the bespoke river catchments sets a clear and sustainable allocation regime for rivers in Otago which provides social, cultural and economic benefits as it provide: ○ Certainty for existing and potential water users in terms of where water is and is not available. ○ Support for urban growth and rural communities as it clearly shows where water is available.	• Future water use and any associated economic growth in default catchments may require additional water storage infrastructure to meet water needs, while complying with the default take limits and minimum flows.
Option 2: Proposed NES 2008	• Provides a relatively clear and simple allocation regime to manage and implement for most rivers in Otago with lower costs associated to administer and implement (compared to option 3).	• Provides less protection for rivers and their associated ecosystems from the risk of adverse effects of water takes compared to option 1 and 3 (Hayes, Booker, Singh, & and Franklin, 2021). • This option allows greater levels of

	BENEFITS	COSTS
	• Is more permissive than option 1 and provides for a greater level of water use.	water take at a rate that: ○ offers less to protection and safeguarding of freshwater resources, and manging uncertainty in relation to the effects of climate change (Hayes, Booker, Singh, & and Franklin, 2021), ○ may result in future over-allocation from rivers subject to this approach (Auspurger, Olsen, & and Dyer, 2024). • For example, by setting a limit of 50 % 7DMALF (in the absence of detail river studies) there is a risk that in some catchments this level of abstraction may have adverse effects and therefore result in over-allocation based on these effects, rather than exceeding the limit (Hayes, Booker, Singh, & and Franklin, 2021) (Auspurger, Olsen, & and Dyer, 2024)
Option 3: River categories	• Provides many of the benefits of option 1, including a high level of protection for smaller rivers and the ecosystems they support from the adverse effects of water takes, in the absence of detailed river catchment studies. Particularly as the risks of adverse effects is typically higher in small streams than in larger streams and rivers (Beca, 2008). • Provides for a higher level of water use from relatively larger rivers subject to this allocation method.	• Provides a more complex default allocation regime to implement than options 1 and 2.

108. Table 11 below assesses the effectiveness and efficiency of the proposed options in achieving the objectives.

Table 11: Efficiency and effectiveness assessment of proposed options for default allocation methods for rivers in EFL chapter.

Effectiveness

Option 1: Hayes method (preferred option)	• This option is considered effective for achieving the objectives relevant to the EFL chapter, particularly the environmental outcomes for each FMU and rohe. • This option is likely to be successful at achieving the objectives. The proposal provides protection (in the absence of detailed river catchments studies) against more than minor effects on instream freshwater values arising from the take and use of water from the rivers, while still allowing for future water use (Hayes, Booker, Singh, & and Franklin, 2021). • For example, the limits are considered to provide a high level of protection, for values such as ecosystem health, and natural form and character of rivers. This supports the achievement of environmental outcomes set through engagement with the community and mana whenua through the NOF process. There is widespread acceptance within the community for the need to sustainably manage the take and use of water form Otago's rivers.
Option 2: Proposed NES 2008	• This option is considered a less effective way to achieve the objectives compared to Option 1, as the more permissive allocation regime proposed under Option 2 poses a higher level of risk of more than minor effects on instream freshwater values arising from take and use of water from the rivers (Hayes, Booker, Singh, & and Franklin, 2021).
Option 3: River categories	• Provides many of the benefits of option 1 and a higher level of protection for smaller rivers, while providing for a higher level of water use from larger rivers. • Like Option 2, Option 3 is considered less effective than option 1, in achieving the objectives relevant to the EFL chapter, particularly the environmental outcomes for each FMU and rohe as, although the risks on instream freshwater values arising from take and use of water tend to be relative to the size of a river catchment, option 3 allows for a more permissive allocation regime and higher degree of modification for large rivers. For some rivers this may result in a nigher degree of uncertainty in terms of option 3's ability to achieve the relevant objectives.
Efficiency	
Option 1: Hayes method (preferred option)	• Considered an efficient way to achieving the objectives relevant to the EFL chapter. • Likely to safeguard the river catchments from no more than minor effects on instream freshwater values arising from take and use of water (in the absence of detailed river catchment studies) (Hayes, Booker, Singh, & and Franklin, 2021), and supports achieving the relevant objectives. • Provides for future water use while ensuring that this occurs within sustainable limits. It reduces the risk of over-allocating water in river catchments where there is uncertainty or little technical information available. This approach avoids setting an allocation regime that is overly permissive and reduces the risk of over-allocating from rivers subject to this method. This in turn avoids any potential future costs associated with the need to reduce water use in river catchments that are currently subject to low water demand. • Provides a clear and certain allocation regime allowing potential water users to make informed investment decisions. • Does not preclude further investigation or detailed river catchment studies occurring in default river catchment where water demand increases following notification of the pLWRP.
Option 2: Proposed NES 2008	• Provides a clear allocation regime for river catchments but is considered less efficient in achieving the objectives relevant to the EFL chapter than Option 1. • Creates a risk of greater adverse effects on instream freshwater values than Option 1, as Option 2 provides for a more permissive allocation regime resulting in greater risk of over-allocation and degradation, especially in light of anticipated climate change effects on river flows.

Option 3: River categories	• While Option 3 provides many of the benefits of option 1, it is considered a less efficient way to achieving the objectives relevant to the EFL chapter than option 1. Particularly as the simpler allocation regime proposed in option 1 is considered sufficient to protect the values of smaller rivers with high instream values. • Proposes a cautious allocation regime for small, medium and outstanding rivers, and more a permissive regime for large rivers. However, as with option 2, there is a risk that a more permissive allocation regime for some rivers in the absence of detailed river studies may result in over-allocation and degradation, especially in light of anticipated climate change effects on river flows. Although this may be somewhat reduced given that most larger rivers subject to this approach have a low water demand given their high rainfall. For example, catchments in the headwaters of the Upper lakes rohe. • Creates a more complex allocation regime to implement compared to the other options considered, and this added complexity is likely not required given that option 1 provides adequate protection to achieve the relevant objectives.

1.7.6. Conclusion

109. Option 1 is the preferred option for setting default minimum flows and take limits for river catchments in Otago and is considered the most appropriate way to achieve the objectives relevant to the EFL chapter. As discussed above, option 1 is considered the most effective and efficient option and the benefits associated with implementing the minimum flows and take limits proposed by option 1 outweigh any of the associated costs. The default allocation method proposed in option 1 safeguards instream freshwater values from the take and use of water from the rivers in the absence of detailed river catchment studies, while allowing for future water use.

1.8. Sub-topic: Rivers - setting flows and limits for additional allocation and high flow harvesting and water storage

110. Policy direction in the pORPS requires the pLWRP to provide for the allocation and use of fresh water in accordance with LF-FW-P7A, which includes by providing for off-stream water storage.[17] Setting additional take limits and associated minimum flows for rivers to provide for the harvesting and storage of fresh water will support the ability of people and communities to meet their needs and increases resilience against the effects of climate change and water scarcity conditions. However, setting these additional take limits and minimum flows must be done in a way that meets the requirements of clause 3.17(4) of the NPSFM and provide for the health and wellbeing of rivers and the ecosystems they support.

111. The proposed B block allocation regime[18] in the pLWRP provides for additional allocation above the A Block regime discussed in the sub-topic section above. As with the approach

[17] For example, see LF-FW-M6(5A)

[18] B block allocation is the equivalent to "supplementary allocation" in the Water Plan, in that it provides for additional take limits above the first "A block" take limit. The proposal renames the terminology to describe the allocation regime for rivers to a simpler A and B take limits and flow regime and transitions away from the current "primary/supplementary/further supplementary' framework. This is considered appropriate given the complexity • and historical issues with water quantity management and accounting in Otago, and the suite of changes required to impalement higher order planning direction.

for setting A block take limits and minimum flows, the proposal for the B block regime includes set minimum flows and take limits based on a default allocation method for most rivers in Otago[19] and sets bespoke B block minimum flows and take limits for rivers that are not subject to the default method.[20]

112. The catchments with bespoke B blocks take limits and minimum flows proposed in the pLWRP, are predominantly those with existing supplementary allocation limits and minimum flows set in schedule 2B of the Water Plan (Olsen D. , 2024d). For these catchments there are bespoke B block take limits and minimum flows proposed up to a certain flow, above which any subsequent blocks will be determined according to the default method.

113. As discussed above, aspects of the current planning framework that establishes supplementary allocation are inconsistent with higher order planning instruments. In particular, the Water Plan provides for "further supplementary allocation" which allows for unrestricted water uses at or above mean flows. This is not considered a reasonably practicable option for achieving the relevant objectives of the EFL chapter as it does not recognise the positive impacts that flows at, or above mean can deliver to a river system such as the flushing of sediments and reducing periphyton biomass (Olsen D. , 2023g). Therefore, providing an unrestricted allocation regime above mean flow is a discounted option.

1.8.1. Reasonably practicable options

114. Three reasonably practicable options were identified for setting B block minimum flows and take limits:

a. **Option 1**: New method based on 7DMALF and 3:1 flow sharing regime (preferred option).

b. **Option 2**: Water Plan methodology

c. **Option 3**: Water plan methodology with a different flow sharing regime.

1.8.1.1. Option 1: New method based on 7DMALF and 3:1 flow sharing regime (preferred option)

115. This option proposes a default 3:1 flow sharing method to set B block take limits and minimum flows.[21] This option will apply to all rivers where there are no bespoke B block take limits and minimum flows set in the pLWRP, and will be implemented through the consenting process. This method will also apply to bespoke catchments at flows above the B block take limits and minimum flows set in the pLWRP.

[19] This applies to the majority of catchments in Otago which have no existing water takes and for some catchments with existing supplementary allocation which has been determined through the consenting process and where there are no bespoke regimes or flow monitoring sites.

[20] See SCHED4 – Rivers: B Block environmental flows, levels and take limits of the pLWRP

[21] The effects of 3:1 flow sharing regime is considered a consistent approach to risk based on presumptive flow standard developed (Richter, Davis, Apse, & Konrad, 2011)

116. Under this option the B Block size is set depending on the size of the river and 75 percent of the block must go to the river, with 25 percent available for allocation. The B block size is either:

    a. the naturalised 7DMALF where rivers have a naturalised 7DMALF below 1 cubic metre per second; or

    b. 1 cubic metre per second where rivers have a naturalised 7DMALF equal to or greater than 1 cubic metre per second.

117. The method for determining the first B block minimum flow from which water is available to take is to add 75 percent of the relevant B block size to the A block minimum flow.

118. Further allocation is provided for as flows increase and subsequent B blocks are stacked above this using the same block size and flow sharing ratio for each allocation block from which the first 75 percent of the block remains in the river before 25 percent is available for allocation and out-of-river use. Figure 3 below demonstrates how B Block minimum flows and limits are set under option 1.

<table>
<tr><td rowspan="2">B Block 4</td><td>B4: take limit (250 l/s %)</td><td rowspan="2"></td></tr>
<tr><td>(750 l/s)</td></tr>
<tr><td rowspan="2">B Block 3</td><td>B 3: take limit (250 l/s)</td><td rowspan="2"></td></tr>
<tr><td>(750 l/s)</td></tr>
<tr><td rowspan="2">B Block 2</td><td>B2: take limit (250 l/s)</td><td rowspan="2">Block 4 minimum flow</td></tr>
<tr><td>(750 l/s</td></tr>
<tr><td rowspan="2">B Block 1</td><td>B1: take limit 250 l/s (EFL-M7)</td><td rowspan="2">Block 3 minimum flow</td></tr>
<tr><td>750 l/s))</td></tr>
<tr><td rowspan="2">A block</td><td>A - take limit (EFL-M3)</td><td rowspan="2">Block 2 minimum flow</td></tr>
<tr><td>A Block minimum flow (EFL-M4)</td></tr>
<tr><td></td><td></td><td>B Block 1 minimum flow</td></tr>
<tr><td></td><td></td><td>A Block minimum flow</td></tr>
</table>

Figure 3: Example of calculation of B Block minimum flows and take limits

119. Figure 3 demonstrates how default B block take limits and minimum flows in a catchment with a naturalised 7DMALF equal to or greater than 1 cubic metre per second are set in accordance with EFL-M6 and EFL-M7. The column on the right in figure 1 shows how the first and subsequent B block minimum flows are stacked above the immediately preceding block. The middle column shows how the take limits under EFL-M7 are set and illustrates the 3:1 flow sharing ratio.

120. Given that this method will largely apply to rivers where there are no monitored minimum flow sites, the implementation of this method will be through the consenting process. Determining the specific block sizes and minimum flows will be set based on the best available hydrological information.[22] The specific limits will be set on a resource consent

[22] For example, as discussed in the summary of the proposal above, ORC developed an allocation model and the best available estimate of 7DMALF based on observed and modelled flows for all applicable catchments will be available through online ORC mapping layers to the public,

through setting of site-specific river flow conditions and accounted within the council water quantity accounting system.

121. This method will also accompany policy direction in the pLWRP that:

a. requires all B Block takes from tributaries to maintain 75% of the flow in tributaries to protect tributary flows. This will be implemented through a consent condition to this effect for any tributary takes; and

b. provides for alternative B Block minimum flows and B Block take limits that achieve the relevant objectives and environmental outcomes for the river to be determined during the consent process, should catchment specific information become available.

1.8.1.2. Option 2: adapt the Water Plan methodology.

122. This option proposes to adapt the 1:1 flow sharing method for setting supplementary allocation flows and limits in the Water Plan [23] to set default B blocks in the pLWRP.

123. Under this option all catchments without bespoke B blocks are subject to a default allocation method blocks that sets blocks according to the size of the river based on the 7DMALF as follows:

Table 12: Proposed B block sizes under Options 2 and 3

7 day mean annual low flow (litres per second)	**B** block (litres per second)
< 10	50
10 – 299	100
300 – 999	250
> 1000	500

124. Under this method, B block minimum flows are set according to the following formula:

a. Assessed actual take + B Block allocation(s) = B block minimum flow; or

b. if actual take cannot be calculated: A block allocation + B block allocation(s) = B Block minimum flow

125. Further allocation is provided for as flows increase because subsequent B blocks are stacked above them using the same block size and 1:1 flow sharing ratio. Under this option the first B block remains in the river before a B block is then available for allocation and out-of-river use.

[23] As discussed in description of the regional planning framework above, the water plan provides for supplementary allocation on a 1:1 flow sharing basis, ensuring that 50% of the flow remains in the river up to mean flow.

1.8.1.3. Option 3: Adapt Water Plan methodology to a 3:1 flow sharing regime.

126. This option proposed the same methodology for determining the B Block size and B block minimum flow as option 2. However, under this option further allocation is provided for on a 3:1 flow sharing ratio and as flows increase and subsequent B blocks (based on table 12 above) are stacked above this using the same block size and 3 allocation blocks go to the river before one block is available for allocation and out-of-river use.

1.8.2. Community and stakeholder feedback

127. The specific flow sharing regime to provide for additional allocation at high flows (e.g. for the purpose of water harvesting for storage) was informed by the feedback received during community engagement. Key messages in the feedback received through the engagement include the following:

a. Providing for high flows takes and water storage is important for water users and achieving environmental flows, levels and take limits, particularly in catchments with higher minimum flows proposed.

b. Water takes for storage during time of high flows should occur in a way that provides for the wellbeing of rivers and freshwater ecosystems, as there is concern that such takes in small rivers can reduce the benefits that high flows bring to the natural character and ecosystem health.

c. There are issues with the status quo, and there needs to be strong policy direction for water harvesting on tributaries, so that the water harvested is proportional to the size of the water body.

128. The feedback received was used to identify the principles upon which the pLWRP framework for setting take limits and minimum flows for allocation at higher for different categories of rivers is based.

1.8.3. Clause 3 feedback

129. Draft provisions based on option 1 were presented during the clause 3 consultation process. There was limited specific feedback received by Clause 3 parties on the proposed approach for providing for B block allocation.

130. The feedback received include supports in principle for the proposed 3:1 flow sharing approach. This was particularly the case as it was seen to provide for sustainable high flow harvesting which assists with resolving over-allocation. There was some concern on the clarity of the policy as drafted, and how this approach will be implemented. These concerns were also raised by iwi authorities in regard to the EFL chapter as a whole.

131. In response to the feedback by clause 3 parties there were amendments made to the policy framework that sets out the approach to setting B block minimum flows and takes limits based on the 3:1 flow sharing regime with the intent to make it clearer.

1.8.4. Clause 4A consultation

132. Iwi authorities considered that the draft provisions for establishing B blocks presented during clause 4A consultation needs to be clearer at explaining what the B flows are and

how they are determined. There also concerns raised in regard to the ability to consider alternative minimum flows and take limits, and a request to reconsider this approach.

133. In response to this feedback:

a. the policy framework has been amended to remove the details for setting flow from the policy framework and include them in a stand alone methods in the pLWRP that set out how these flows and limits are set.

b. Amendments made clarify the extent to which alternative flows and limits can be set and the circumstances where this would apply.

1.8.5. Efficiency and effectiveness assessment

134. Section 32(2)(c) of the RMA requires ORC to take into account the risk of acting or not acting if there is uncertain or insufficient information. While there is currently uncertain and insufficient information available on the hydrology of many of Otago's river catchments, the NPSFM requires that regional councils must not delay decision making in the absence of complete technical data to inform the setting bespoke flow and take limits for rivers.[24] Therefore a method is required to provide for flow variability at higher flows and manage the effects of high flow takes on instream freshwater values based on the best available information.[25] A default method is proposed for determining B Block take limits and minimum flows. The proposed default methods are to be implemented based on the best available information including observed and modelled hydrology and flow statistics for most of the river catchments in Otago.

135. Table 13 below identifies and assesses the environmental, cultural, social, and economic benefits and costs anticipated from implementing the provisions proposed in the three options above.

Table 13: Benefits and costs for setting limits during periods of high flows in rivers

	BENEFITS	COSTS
Option 1: 7DMALF & 3:1 flow sharing (preferred option)	• The proposed 3:1 flow sharing regime maintains higher flows instream to support instream values and achieves a flow regime that "reflects" natural flows (Hayes, Booker, Singh, & and Franklin, 2021) (Richter, Davis, Apse, & Konrad, 2011) • Support flow variability and provides a high level of protection for rivers and the ecosystems they support (Hayes, Booker, Singh, & and Franklin, 2021) (Richter, Davis, Apse, & Konrad, 2011). • Supports actions to reduce and mitigate the potential impacts of less water availability during extended period of	• A 3:1 flow sharing ratio means less water is available for out of stream users, compared to the 1:1 method. • However, whether this reduced availability will impact water users will depend on the particular catchments and the needs and demands for water storage. • Costs associated with application to meet requirements of providing site specific flows. • Providing a clear method for determining minimum flows and allocation blocks at higher flows and specifying these in the plan for some

[24] NPSFM, cl 1.6(3).

[25] NPSFM, cl 1.6(1).

	BENEFITS	COSTS
	low flow restriction, which may be exacerbated by climate change. For example, it supports high harvesting and water storage and ability of people and communities to meet water needs and provide for their wellbeing during time of low flows and restrictions. • Improves the management of tributary takes during periods of high flows and provides greater protection of instream values in tributaries. This includes flows that support ecosystem health, natural form and character, threatened species and taoka species. • Provides for higher flow takes which can reduce the pressure on rivers during times of low flow. • Support the phasing out of over-allocation, as this option supports the taking of additional water during higher flows to water storage which can offset reduced reliability during lower flows. • Setting B block take limits and minimum flows based on river size (7DMALF) ensure allocation regimes are tailored to the flows of each river. • Providing for alternative flows and take limits to be determined through the consent process allows limits to be updated where information becomes available and allows for adaptation to the effects of climate change. A clear and consistent method for all rivers in Otago will minimise the costs of implementing the regime.	catchments should reduce the consenting costs for high flow takes.
Option 2: Water Plan 1:1 flow sharing	A 1:1 flow sharing regime provides for more for out of stream users, compared to option 1. Ensuring that 50% of the flow remains in the river when river flows are above the A block will provide some protection for rivers and the ecosystems, they support but not as much as option1 and 3. Provides the same types of benefits as option 1 and 3 in terms of supporting high flow harvesting and water storage.	• Provide less protection to instream values than option 1 as greater risk of impact on flow regime from a 1:1 flow sharing regime. • Provide less protection for tributaries, as block sizes are less tailored to the consider catchments and their tributaries. • Likely to have similar cost associated with consent applications as other options.
Option 3: Water Plan 3:1 flow sharing	Option 3 has most of the same benefits as Option 1 in terms of providing a flow sharing regime that maintains higher flows instream to support instream values and achieving a	• Less protection for tributaries and smaller rivers as the default allocation block sizes are not as tailored to the flows of each

	BENEFITS	COSTS
	flow regime that "reflects" natural flows. Although this possibly to a less given the block size are less tailored to each river compared Provides the same types of benefits as option 1 and 2 in terms of supporting high flow harvesting and water storage to option 1, although potentially more restrictive than option 1.	river. For example, a river with a 7DMALF of 10 L/s has the same allocation block size (100 L/s) as a river with a 7D MALF of 299 L/s. • Potentially more restrictive for water users than option 1 despite the same flow sharing ratio. This is due to block sizes are less tailored and, in some catchment, may result in relatively restrictive B block minimum flows given that 3 blocks must first go to the river before allocation is available.

136. Table 14 below assesses the effectiveness and efficiency of the proposed provisions in achieving the objectives.

Table 14: Efficiency and effectiveness assessment of option proposed for setting flows and limits for additional allocation and high flow harvesting and water storage

Effectiveness	
Option 1: 7DMALF & 3:1 flow sharing (preferred option)	• Option 1 is effective for achieving the objectives relevant to the EFL chapter and implementing the policy direction in the pORPS and NPSFM. • This Option 1 will likely be successful at achieving the relevant objectives as it proposes specific requirements and a B block regime that recognises that the risk of adverse effects is expected to increase when water is taken at all flows, not just at low flows (Richter, Davis, Apse, & Konrad, 2011). • The proposed 3:1 flow sharing ratio for B Block takes is based on principles outlined in (Hayes, Booker, Singh, & and Franklin, 2021)and is considered to provide an appropriate level of protection for rivers (including tributaries) during higher flows while allowing for high flow harvesting and water storage.
Option 2: Water Plan 1:1 flow sharing	• While Option 2 will likely be effective at providing some protection for in-stream values, it is unclear whether this proposal it will achieve the requirement to set environmental flows that achieve the environmental outcomes for each FMU or parts of an FMU. The proposed 1:1 flow sharing regime provides less protection across the entire flow regime and there is greater risks to in stream values, particularly in tributaries.
Option 3: Water Plan 3:1 flow sharing	• This option will be effective at providing protection for in-stream values given that it proposes a 3:1 flow sharing ratio. However, it is unclear if it will achieve the requirement to set environmental flows that achieve the environmental outcomes for each FMU or parts of an FMU. It is less clear whether this option will support high flow harvesting and water storage as effectively as option 1, given the less tailored block size. And the potential that this may resutl in an overly restive B block regime in some catchments.
Efficiency	
Option 1: 7DMALF & 3:1 flow sharing	• Option 1 is considered an efficient proposal for setting B block minimum flows and take limits in a way the achieve the objectives relevant to the EFL chapter and implement the policy direction in the pORPS and NPSFM.

(preferred option)	• While there may be some potential costs associated with this option such as reduced reliability and ability compared to a 1:1 flow sharing regime. The benefits of this proposal outweigh the potential costs as this option provides for future water use, high flow harvesting and water storage whiles supporting flow variability and providing a high level of protection for rivers and the ecosystems they support.
Option 2: Water Plan 1:1 flow sharing	• Option 2 is considered a less efficient proposal for setting B block minimum flows and take limits. • While this option provides some protection to instream values and a higher level of water availability and reliability, the proposes 1:1 flow sharing ratio allows higher degree of hydrological alteration and therefore a potentially higher ecological risk. The potential environmental costs of a more permissive B block regime outweigh the benefits, particularly when considered in light the policy direction of higher order planning instruments and objectives relevant to the EFL chapter.
Option 3: Water Plan 3:1 flow sharing	• Option 3 it is considered a less efficient option than option 1. Although this proposal supports flow variability and providing a high level of protection for rivers and the ecosystems they support, there is risk that it is overly restive in some catchments which will not support high flow harvesting and water storage. This potential cost is considered unjustified, particularly when option is considered to provide the appropriate level of protection to achieve the objectives relevant to the EFL chapter.

1.8.6. Conclusion

137. Option 1 is the preferred option for setting blocks and take limits as it is considered the most appropriate way of achieving the purposes of the RMA. This proposal is considered the most effective and effect method for achieving the objectives relevant to the EFL chapter. The benefits associated with implementing the B Block minimum flows and take limits according to the method proposed in Option 1 outweigh any associated potential cost. The proposed default method will safeguard the health and wellbeing of rivers across the flow regime while still allowing for high flow harvesting and water storage within sustainable limits.

1.9. Sub-topic: Lakes

138. As discussed in the summary of the proposal, most lakes in Otago will be managed through a 'default' framework with some bespoke water quantity limits set for specific lakes.

139. To recognise the large number of lakes in Otago and the wide variation between them, a pragmatic approach to setting any default framework is needed so that different levels and take limits can be applied to different types of lakes to support achieving the objectives relevant for lakes in the EFL chapter.

140. Bespoke environmental levels and take limits are proposed for the some of the regions larger lakes in the EFL chapter as shown in the table below

Table 15: Proposed environmental flows, levels and take limits for lakes under option 1.

• Lake category	Specific lakes	Bespoke flows, level and take limits
• Natural lakes See Part 1 of SCHED5 – Lakes: Environmental levels and take	Clutha Mata-au FMU, Upper Lake rohe based on detailed studies: * • Whakatipu Waimāori/Lake	*Informed by site specific study (Hawes, 2023)

limits	Whakatipu • Lake Wānaka Taiari FMU: • Waipōuri/Waihola wetland complex	
• Controlled lakes See Part 2 of SCHED5 – Lakes Environmental levels and take limits	• Clutha Mata-au FMU: • Lake Hāwea • Lake Dunstan • Lake Roxburgh • Lake Onslow • Lake Tuakitoto Catchment • Taiari FMU: • Lake Mahinerangi	• Controlled lake levels managed by existing consent conditions that are to be set in the plan. • Take limits set based on connected river catchment.

1.9.1. Reasonably practicable options

141. The reasonably practicable options identified for default allocation methods for setting environmental levels and take limits for lakes are:

a. **Option 1**: Default method based on different lake categories (preferred option).

b. **Option 2**: Default method based on lake depth.

1.9.1.1. Option 1: Set clear limits across different categories of lakes (preferred option)

142. Option 1 proposes a default method for setting environmental levels and take limits for different categories of lake. This method will apply to all lakes within the categories that are not are in table 15 above and subject to bespoke environmental flows, levels and take limits.

143. The proposed lake categories and associated default allocation method for setting environmental flows, levels and take limits are summarised in Table 16.

Table 16: proposed default allocation method for different lake categories.

Lake category	Environmental level	Take limit
Natural lakes (with existing consented takes)	Narrative environmental level: no change in water levels, beyond the water level variation that has been provided for by resource consents on the date of	Narrative take limit restricting the taking of water to existing consented takes and small takes for domestic use and animal drinking water

	notification of pLWRP	
Natural lake (with no existing takes)	Narrative environmental level: no change in water levels.	Narrative take limit restricting the taking of water to small takes for domestic use and animal drinking water

144. This option sets clear limits across a range of lakes and protects the numerous highly valued, small natural lakes of Otago, while enabling existing water use and limiting future water use.

1.9.1.2. Option 2: Default framework based on lake depth

145. Option 2 proposes setting default environmental levels and take limits based on lake depth. This option only applies to lakes that are not subject bespoke water environmental levels and take limits.

146. This option is based on the framework proposed in the Draft Guidelines for the Selection of Methods to Determine Ecological Flows and Water Levels 2008. The proposed framework is summarised in Table 17:

Table 17: proposed default allocation framework for lakes under option 2.

Lake depth	Take limit and level
Deep lakes (> 10 m)	Less than 0.5 m change to median lake level, less than 10% change in mean annual lake level fluctuation and patterns of lake level seasonality (relative summer vs. winter levels) remain unchanged from the natural state
Shallow lakes (≤10m)	Less than 10% change in median lake level, less than 10% change in mean annual lake level fluctuation and patterns of lake level seasonality remain unchanged from the natural state.

147. This option requires applicants to provide information on lake depth and statistics on the lake level to determine the limits on any proposed water take from any lake that is not subject to bespoke limits.

1.9.2. Community and stakeholder feedback

148. A theme identified throughout community engagement was that the Otago's diverse range of lakes are highly valued by the community. There was limited specific feedback received on the proposal for setting environmental levels and take limits for lakes. However, there was feedback managing some lakes with current consents to the minimum flow of the river catchment may not maintain natural lake levels, habitat or natural character.

149. The approach based on option 1 was largely retained after community engagement as it was considered and appropriate way to set limits on the diverse range of Lakes in Otago. However, there were some amendments made to make the provision clearer for different categories of lakes.

1.9.3. Clause 3 consultation

150. Draft provisions based on option 1 were presented during the clause 3 pre-notification consultation. Feedback received from clause 3 parties was mixed with some in support and others opposing the proposal in Option 1.

151. Concerns were raised that the minimum lake levels for controlled lakes proposed under option 1 may:

a. have unintended consequences for the purpose and operation of controlled lakes; or

b. be impracticable as drafted given the purpose of controlled lakes and interfere with necessary maintenance of damming infrastructure, existing renewable electricity generation.

152. In regard to the limited on natural lakes excluding those with bespoke limits to small take there were parties seeking that the small takes provide for include water takes for the purpose of biosecurity operations.

153. There was no specific feedback received on the proposal for lakes from iwi authorities.

154. In response to the feedback received, the proposed provisions were amended to provide clearer direction for the setting of environmental flows, levels for lakes in Otago. This includes providing direction in relation to controlled lakes and the maintenance and operation of existing regionally and nationally significant infrastructures and renewable electricity generation activities associated with controlled lakes below the minimum lake levels.

1.9.4. Clause 4A consultation

155. No specific feedback was received on the proposal during clause 4A consultation.

1.9.5. Efficiency and effectiveness assessment

156. Section 32(2)(c) of the RMA requires ORC to take into account the risk of acting or not acting if there is uncertain or insufficient information. There is uncertain and insufficient information on the characteristics and hydrology of many of Otago lakes. Setting environmental levels and take limits based on default methods based on the best available information will manage the risk to lakes from water takes.

157. Table 18 below identifies and assesses the environmental, cultural, social, and economic benefits and costs anticipated from implementing the proposed options.

Table 18: Benefits and costs for proposed water quantity limits for Lakes in EFL chapter

	BENEFITS	**COSTS**
Option 1: Categories (preferred option)	• Provides a high level of protection for lakes and the ecosystems they support from the adverse effects of water taking. • Sets clear limits for water use and avoids over-allocation, while still providing for future water use from some lakes to support	• Less water available to take from some lakes in Otago. • Costs for ORC associated with monitoring levels for some lakes with minimum levels proposed.

	BENEFITS	COSTS
	economic development. • Clear categorisation of lakes and associated limits in option creates a relatively simple allocation regime to implement and enforce.	
Option 2: Default framework	• May provide for a higher level of water use in some lakes than option 1. • Ensures that there is no more than a low risk of hydrological change in Otago's lakes that are subject to this default method (Beca, 2008).	• Creates a complex management regime for taking water form lakes that are not subject to bespoke levels and take limits. • The low-risk framework based on lake depth is complex to implement and will require significant information to be gathered by ORC and water users.

158. Table 19 below assesses the effectiveness and efficiency of the proposed provisions in achieving the objectives.

Table 19: Efficiency and effectiveness assessment of options for setting environmental levels and take limits for lakes

Effectiveness	
Option 1: Categories (preferred option)	• Considered an effective way to achieve the objectives relevant to lakes in the EFL chapter. The proposed lake categories and associated environmental level and take limits recognise the variety of lakes across Otago and protect their values while providing for an appropriate level of future water use. • Provides a precautionary allocation method that is likely to achieve the objectives relevant to the EFL chapter. For example, it results in low risk to lakes and the ecosystems they support from the effects of water take and use and is consistent with achieving natural character, including form and function, of lakes, that reflects their natural behaviours.
Option 2: Default framework	• Is considered a less effective way to achieve the objectives relevant to lakes in the EFL chapter, than Option 1, by setting a framework that will be complex to implement and will require considerable information and investigation by ORC and water users to determine the appropriate take limits for numerous lakes in Otago.
Efficiency	
Option 1: Categories (preferred option)	• Is considered an efficient way to achieve the objectives relevant to lakes in the EFL chapter as it sets environmental levels and take limits that ensure the protection highly valued lakes and the ecosystems the support, while providing for future water use where this is consistent with achieving the objectives. • Creates a clear allocation regime for lakes in Otago, which in turn creates certainty for current and future water users on the availability of water. While there are costs associated with implementing this allocation regime, these are justified as they provide a more certain planning framework.
Option 2: Default framework	• Considered a less efficient way to achieve the objectives relevant to lakes in the EFL chapter than Option 1. • Creates uncertainty in terms of water availability and places a large onus on ORC and water users to investigate and collect information to determine take limits based on lake depth.

1.9.6. Conclusion

159. Option 1 is the preferred option as it is the most appropriate way for achieving the objectives relevant to the EFL chapter. As discussed above the benefits of associated with implementing Option 1 outweigh the costs. The default methods for setting environmental levels and take limits for lakes under Option 1 provide a high level of protection for Otago's lakes while allowing for existing and future water within appropriate limits. In addition, Option 1 provides a more comprehensive and certain allocation regime for the great variety of Otago lakes compared to Option 2.

1.10. Subtopic: Groundwater

160. The EFL chapter proposes to set take limits for groundwater by setting either a bespoke allocation regime, where detailed aquifer studies have been conducted, or by a range of default methods depending on the type of aquifer.

161. A total of 12 alluvial ribbon aquifers with a direct hydrological connection with a surface water body have been mapped and identified in Part 2 of SCHED6– Groundwater: Take limits of the pLWRP. Any environmental flows, levels or take limits set for the connected surface water body will apply to any water take from these alluvial ribbon aquifers.

162. For aquifers not directly connected to surface water, the pLWRP does not propose to set environmental levels that restrict the taking of water (often referred to as "trigger levels"). Setting robust trigger levels is challenging given the geological variety of aquifers across Otago, and the hydrological and geological complexity even within single aquifer systems. Establishing robust trigger levels requires significant aquifer investigation and long-term monitoring information. This information is currently not available. In addition, upon review the existing trigger levels in the Water Plan are considered ineffective in manging the effects of groundwater takes and have therefore not been carried over into the provisions of the pLWRP. For example, most existing trigger levels in the Water Plan have never been reached (Ettema, 2023).

163. As it is not possible to set environmental levels, take limits for groundwater have been set at volumes that aim to maintain long-term aquifer storage volumes and mean annual groundwater levels to ensure that any taking of water meets the environmental outcomes for the groundwater, any connected water body, and receiving environments. This includes meeting the environmental flows and levels set for the FMU and any directly or indirectly connected surface water bodies.

164. While the pLWRP does not set environmental levels as trigger levels that restrict the taking of water from aquifers with a direct hydrological connection with a surface water body, it does propose to set take limits as an annual volumetric limit.

165. The aquifers to be managed by bespoke take limits are included in Part 1 of SCHED6– Groundwater: Take limits of the pLWRP. The proposed take limits for these aquifers are based on detailed aquifer studies (Yeo S. , 2024; Dumont, Rekker, & Etheridge, 2023)

166. For mapped or unmapped aquifers for which no detailed aquifer studies have been undertaken default allocation methods are proposed. See Part 3 and Part 4 of SCHED6– Groundwater: Take limits. Future bespoke allocation regimes are a long-term aim after further studies have been conducted using data from newly installed monitoring bores (yeo, 2024).

1.11. Sub-topic: Mapped default aquifers

167. There are 31 mapped aquifers in Otago that are proposed to be subject to a default allocation method. See Part 3 and 4 of SCHED6– Groundwater: Take limits.

1.11.1. Reasonably practicable options

168. Two reasonably practicable options were identified for setting default take limits for mapped aquifers:

a. **Option 1**: Default method that sets the take limit at 35 % of mean annual recharge (preferred option).

b. **Option 2**: Default method based on proposed 2008 NES Ecological Flows and Water Levels

1.11.1.1. Option 1: default method that sets the take limit at 35% of mean annual recharge (preferred option)

169. This option sets take limits for the 31 mapped aquifers that are not subject to bespoke limits as the greater of either:

a. 35 percent of the mean annual recharge; or

b. the total consented allocation from the aquifer on the date that the pLWRP is notified.

170. The take limits set under this method will be set as an annual limit measured as m3/year.

171. This option has been derived from recommendation in the 2008 Proposed NES on Ecological Flows and Water Levels. (Ministry for the Environment, 2008) Under this option 5 of the 31 mapped aquifers will have a take limit set as the total consented allocation from the aquifer on the date the pLWRP is notified.

1.11.1.2. Option 2: Default method based on proposed 2008 NES Ecological Flows and Water Levels

172. This option proposes to set default environmental levels and take limits based on the recommended interim limits for groundwater from the 2008 Proposed NES on Ecological Flows and Water Levels.

173. The proposed aquifer types and associated take limits are summarised in Table 20.

Table 20: proposed default allocation method under option 2.

Aquifer type	Take limit
For shallow, coastal aquifers (predominantly sand)	Whichever is the greater: 15 percent of the average annual recharge; or the total consented allocation from the mapped aquifer on the date that the pLWRP is notified.
For all other aquifers	Whichever is the greater of:

	35 percent of the mean annual recharge as calculated by the regional council; or the total consented allocation from the mapped aquifer on the date that the pLWRP is notified.

174. As with option 1, the take limits set under this method will be set as an annual limit measured as m^3/year.

1.11.2. Community and stakeholder feedback

175. Draft provision based on option 1 were presented during the third round of community engagement. There was mixed feedback in support and opposition to the proposal. Due to hydrological and ecological uncertainty some feedback requests a precautionary principle being applied. Especially in relation to ephemeral and intermittent streams where ground-surface water interactions are often unknown or best guessed. Some considered setting take limit for mapped default aquifers at 35 percent of mean annual recharge to be appropriate. Conversely, other consider the proposal to be too restrictive and that the current setting at 50 percent should be retained.

176. The proposed approach was retained as it is considered appropriate for achieving the relevant objective, and for most aquifer where this proposal applies it still provide for addition water allocation.

1.11.3. Clause 3 consultation

177. Draft provisions based on Option 1 were consulted on during the clause 3 pre-notification consultation. Feedback received from clause 3 parties showed diverging views:

a. Some parties support the setting of precautionary default limits.

b. Some parties oppose default take limits and flows for aquifers and would prefer bespoke limits to be set based on specific information.

c. Some parties oppose setting take limits based on consented allocation.

d. Some parties consider the default method to be too permissive, and that a take limit of no more than 15 percent for all default aquifers is more appropriate.

178. There was no specific feedback received by Iwi authorities on the proposed approach for groundwater. Although general feedback and concern on the use of interim limit set at the sum of all consent are relevant to the aspect of the proposal where this applies.

179. Following the feedback received some amendments were made to the proposed provision to make the drafting clearer, however, the general approach and to setting default limits for mapped aquifers was retained as this proposed limit are bested on technical advice received in the development of the pLWRP.

1.11.4. Clause 4A consultation

180. There was no specific feedback received by Iwi authorities on the proposed approach for groundwater during the clause 4 consultation process. However, the general feedback and concern received on the use of interim limit set at the sum of all consent are relevant to

the aspect of the proposal where this applies to the ground water proposal. In response to the feedback, the provisions were amended to include a method for calculating the sum of all consents to make it clearer how this interim approach applies.

1.11.5. Efficiency and effectiveness assessment

181. Section 32(2)(c) of the RMA requires ORC to take into account the risk of acting or not acting if there is uncertain or insufficient information. Default allocation methods set environmental levels and take limits for aquifers in the absence of detailed aquifer studies. Default allocation method manage the risks and potential adverse effect that may occur as a result of water takes from groundwater. For example, not acting poses risks to aquifer water storage levels, connected surface water bodies, and of seawater intrusion into aquifers.

182. Table 21 below identifies and assesses the environmental, cultural, social, and economic benefits and costs anticipated from implementing the options presented above.

Table 21: Benefits and costs for proposed options for default allocation method for mapped aquifers.

	BENEFITS	COSTS
Option 1: **35 % MAR** **(preferred option)**	• Sets precautionary limits that ensure a low risk of adverse effects on aquifer levels and any hydrologically connected surface water bodies, in the absence of detailed aquifer information. • Provides for future water use from most mapped aquifers in Otago (26 out of 31) thereby supporting social, cultural and economic wellbeing of communities. • Sets an allocation regime that is relatively simple to manage and implement (when compared to option 2.) For example, there is no distinction between different types such as shallow, or coastal aquifer (Yeo S. , 2023a). • Provides for existing water users in aquifers where the total consented allocation volume exceeds 35 percent of mean annual recharge.	• Reduces the quantity water available for future water use. • In the absence of aquifer information that could inform bespoke limits setting, some aquifers will be fully allocated or approaching full allocated meaning a restriction on future water takes. • Cost associated with making up to date information, including info of allocation status, available to public.
Option 2: **Draft NES 2008**	• Sets precautionary limits that ensure a low risk of adverse effects on aquifer levels and any hydrologically connected surface water bodies and manages the risk of saltwater intrusion.	• Sets an allocation regime for default aquifers that is more complex to manage and implement than Option 1. • Sets more precautionary take limits which restrict future water taking from some aquifers more than option 1

183. Table 22 below assesses the effectiveness and efficiency of the proposed provisions in achieving the objectives.

Table 22: Efficiency and effectiveness assessment of options for default allocation method for mapped aquifers.

Effectiveness	
Option 1: 35 % MAR (preferred option)	• Option 1 is considered an effective way to achieve the objectives in the EFL chapter that are relevant to groundwater. This proposed default method sets precautionary environmental levels and take limits that ensure low risk to groundwater resources from the effects of water use in the absence of detailed aquifer studies. For this reason, it is likely to be successful at achieving the objectives relevant to the EFL chapter.
Option 2: Draft NES 2008	• Option 2 is not considered to be as effective as Option 1 for achieving the objectives in the EFL chapter that are relevant to groundwater. • The default method proposed in Option 2 sets significantly more restrictive environmental levels and take limits for aquifers that fall within the shallow or coastal category. While the precautionary approach promulgated under Option 2 safeguards ground water resources in the absence of detailed aquifer studies, Option 2 is considered overly restrictive for shallow and coastal aquifers compared to Option 1.
Efficiency	
Option 1: 35 % MAR (preferred option)	• Option 1 is considered an efficient way to achieve the objectives in the EFL chapter relevant to groundwater. • The default method proposed under Option 1 prevents further water allocation in 5 aquifers that are considered fully allocated (based on the sum of all consents) and reduces the volume of water that is available for future allocation in 26 aquifers compared to the status quo. However, this is justified in light of the need to safeguard groundwater resources and avoid over-allocation. Setting precautionary limits to manage uncertainty and avoid over-allocation and potential future costs associated with having to reduce water use and allocation in the future.
Option 2: Draft NES 2008	• Option 2 is considered a less efficient way to achieve relevant objectives in the EFL chapter Option 1. • With respect to future allocation from some aquifers, option 2 is considerably more restrictive than option 1, which will limit opportunities for future water use. These costs are likely to outweigh the benefits of setting precautionary limits to manage risks to groundwater, particularly given that Option 1 is considered to sufficiently manage these risks, while also allowing for some future water use.

1.11.6. Conclusion

184. Option 1 is the preferred option as it is considered the most appropriate way to achieve the objectives in the EFL chapter relevant to groundwater. The benefits of the default allocation method proposed in Option 1 outweigh the costs associated with this option. For example, the default take limits provide a high level of protection for groundwater while allowing for existing and future water use in most aquifers that are subject to the proposal.

1.12. Sub-topic: Unmapped default aquifers

185. Many of Otago's confined and unconfined aquifers have been mapped for the purpose of water allocation. However, there are still aquifers and groundwater resources that have the potential for hosting variably yielding water resources, such as fractured rock aquifers, that remain unmapped for the purpose of allocation. At present there is no planning framework in the operative Water Plan to set environmental levels and take limits for

unmapped aquifers, such as fractured rock aquifers. There is a risk that further exploration and demand of alternative groundwater sources, such as fractured rock aquifers, will occur in the future as a result of the restrictions and limits on water taking from common water sources set through environmental flows, level and take limits (Yeo S. , 2023).

1.12.1. Reasonably practicable options

186. The options proposed below fill this gap in the current planning framework. The two reasonably practicable options identified are:

a. **Option 1**: Take limit based on average annual rainfall accumulation (preferred option).

b. **Option 2**: Take limit based on radius of influence.

1.12.1.1. Option 1: Set a take limit at landholding scale based on average annual rainfall accumulation (preferred option).

187. Option 1 proposes to set take limits at a landholding scale based on a percentage of the average annual rainfall accumulation over a landholding. This option allows for water takes of no more than 5% of the average annual rainfall accumulation over the landholding.

188. This option is based on the findings from studies conducted by ORC that estimate that only 2.5-3.5% of average annual rainfall ultimately makes it to a fractured rock aquifer as recharge (Otago Regional Council, 2004).

1.12.1.2. Option 2: Prescriptive radius of influence calculation method

189. This option proposes the use of a prescriptive method from (Gragoni, 1998) to determine a take limit for a landholding by way of the Radius of Influence calculation as follows:

$$R = b \times \sqrt{\frac{K}{2 \times N}}$$

Where·(units).¶

b·=·saturated·thickness·(m)¶

K·=·hydraulic·conductivity·(m/T)¶

N·=·recharge·(m/T)¶

Figure 4: The radius of influence determines the maximum distance from a pumping well where drawdown can be measured.

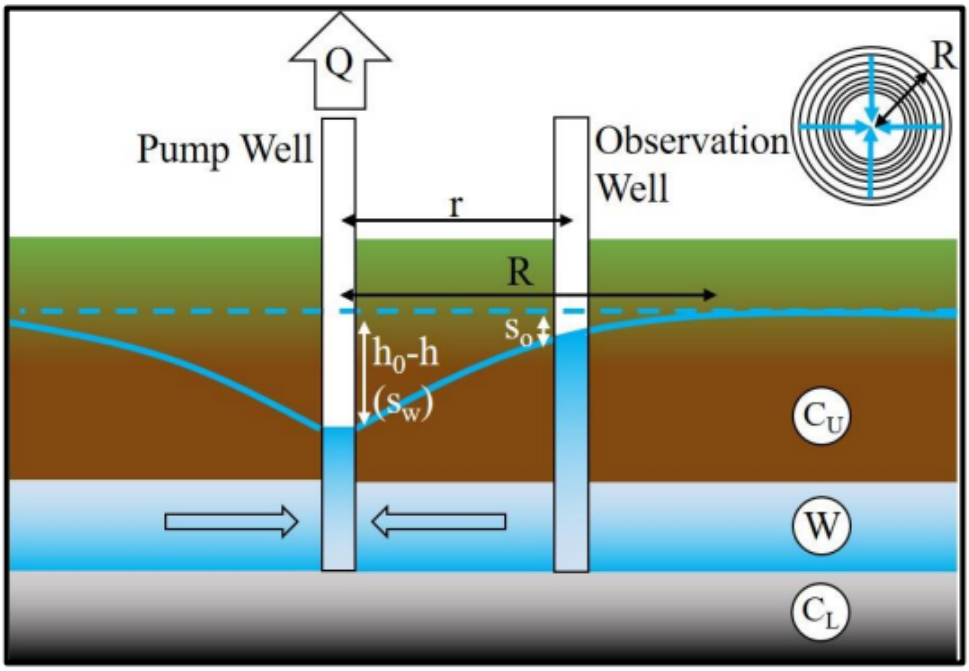


Figure 2.1 Schematic drawdown in a confined aquifer due to pumping (modified from Freeze & Cherry, 1979). Illustration of radial flow, seen from above, in upper right corner. Q = flow/pump rate, r = horizontal distance between pump well and observation well, R = Influence radius, C_U = upper confining layer, W = water-bearing layer, C_L = lower confining layer, $s_w = h_0$-h = drawdown in pump well, s_o = drawdown in observation well.

Figure 5: Schematic drawdown in a confined aquifer due to pumping.

1.12.2. Community and stakeholder feedback

190. A summary of draft provisions based on option 1 were presented during the third round of community engagement. There was limited specific feedback received on the proposal. However, for some take limits for unmapped aquifers was considered too restrictive and that it should be the same as for other mapped default aquifer.

191. While the feedback was considered, the proposed approach to setting take limits for unmapped aquifers such as fractured rock aquifers was retained as it is considered appropriate for this narrow set of aquifers.

1.12.3. Clause 3 consultation

192. Draft provisions based on option 1 were presented during Clause 3 pre-notification consultation. Responses received from clause 3 parties with respect to the use of default methods for setting environmental flows, levels and take limits were mixed with some clause 3 parties showing support and other being opposed to this approach (see discussion above). However, there was no specific feedback received on the proposal for setting take limits for unmapped aquifers.

193. Following the feedback received the general approach and to setting default limits for unmapped aquifers was retained as the proposal is consider appropriate for achieving the relevant objectives.

1.12.4. Clause 4A consultation

194. There was no specific feedback reviewed by iwi authorities on the proposal during clause 4A consultation.

1.12.5. Efficiency and effectiveness assessment

195. Section 32(2)(c) of the RMA requires ORC to take into account the risk of acting or not acting if there is uncertain or insufficient information. There is currently limited information available on the water availability in unmapped aquifers. There is some risk in not acting and establishing an appropriate default method for setting environmental levels and take limits for unmapped aquifers, particularly fractured rock aquifer. The risk is that with more restrictive environmental flows, level and take limits proposed for common water sources, further exploration and demand of alternative sources such as fractured rock aquifer will occur in the future.

196. Table 23 below identifies and assesses the environmental, cultural, social, and economic benefits and costs anticipated from implementing the options proposed above.

Table 23: Benefits and costs for options proposed for setting default environmental levels and take limits for unmapped aquifers.

	BENEFITS	COSTS
Option 1: Landholding based (preferred option)	• Sets precautionary limits that still provide for future water use. • Establishes a pragmatic method management framework for addressing a gap in the management framework of the current Water Plan and provides more certainty for water users. • The use of pragmatic and relatively simple method to determine take limits based on a land holding scale is a cost-effective way to determine water availability from fractured rock aquifers. • Less costs associated with resource consent application than option 2 as the need to assess rainfall accumulation and determine a limit on a land holding scale	• May restrict water use from fractured rock aquifers or unmapped aquifers in some instances, such as where the recharge is higher than 5 percent. • However, given fractured rock aquifers are potentially self-limiting, future water user may not necessarily be able to yield the full take limit.

	BENEFITS	COSTS
	require less technical work to complete.	
Option 2: Radius Calculation	• Provides for an assessment of the effects of water takes from unmapped aquifers and allows for a tailored assessment on the water available on a landholding scale.	• Prescriptive method that relies on technical expertise, and less pragmatic. • Method is limited and not necessarily appropriate in all fractured rock terrains, for example, the calculation assumes flat terrain. • Cost for water users associated with the need to engage technical experts capable of applying the method.

197. Table 24 below assesses the effectiveness and efficiency of the options proposed above in achieving the objectives.

Table 24: Efficiency and effectiveness assessment for options proposed for setting environmental levels and take limits for unmapped aquifers.

Effectiveness	
Option 1: Landholding based (preferred option)	• Option 1 is considered an effective proposal for achieving the objectives in the EFL chapter relevant to ground water. • As discussed above, the proposed method for determining take limits for unmapped aquifers set out under Option 1 establishes a pragmatic management framework that targeted towards addressing gaps in the current planning framework and achieve the objectives relevant to groundwater. • Options 1 will likely be successful at achieving the relevant objectives as provides a relatively straight forward method to implement as it requires an assessment of the rainfall accumulation at a landholding scale based on best available information.
Option 2: Radius Calculation	• Option 2 is not considered an effective proposal for achieving the objectives in the EFL chapter relevant to ground water. The proposal is considered a less pragmatic and more complicated approach than option 1, due to the more prescriptive and highly technical nature of the method proposed and higher costs.
Efficiency	
Option 1: Landholding based (preferred option)	• Option 1 is considered an efficient proposal for achieving the objectives relevant. As discussed above, the proposal establishes a cost effective and pragmatic method for setting take limits for unmapped aquifers in Otago.
Option 2: Radius Calculation	• Option 2 is considered a less efficient way to achieve the objectives in the EFL chapter relevant to groundwater than option 1. The proposed method is technical and costly to implement and does not manage any of the uncertainties associated with the water availability of unmapped aquifers more effectively than option 1.

1.12.6. Conclusion

198. Option 1 is the preferred option as it is considered the most appropriate way to achieve the objectives in the EFL chapter relevant to groundwater. As discussed above, option 1

provide a pragmatic and cost-effective default method that will be simpler to implement than option 2 while allowing for future water use.

2. Achieving environmental flows, levels and take limits

2.1. Introduction

199. The EFL chapter contains provisions that that are relevant to achieving the environmental flows, levels and take limits that are proposed in the LWRP, particularly the bespoke flows, level and limits that are not currently being achieved.

200. This section evaluates the provisions in the EFL chapter that focus on achieving the environmental flows, levels and take limits for water bodies in Otago.

201. The provisions discussed in this section are those relating to the following ten topics:

a. Phasing out over-allocation.

b. Managing site specific river flows.

c. Managing surface water depletion effects of groundwater takes.

d. Efficiency of use of water.

e. Water quantity accounting of water takes and associated discharges.

f. Water conveyance.

g. Cross mixing of water.

h. Transfer of water permits.

i. Managing non-consumptive takes.

j. Protecting fish from water intakes.

2.2. Issues

202. The resource management issues described in section 1.2 above are all relevant to the topics in this section. There are also specific issues with how the Water Plan manages these topics that will be summarised in the next section.

2.3. Status quo policy context (including the operative Water Plan)

203. This section provides a summary of the relevant policy direction and requirements in higher order planning instruments in relation to achieving environmental flows, levels and take limits and the relevant provisions in the operative Water Plan.

2.3.1. National Policy Statement for Freshwater Management 2020 (NPSFM)

204. Policy 11 of the NPSFM requires that freshwater is allocated and used efficiently, all existing over-allocation is phased out, and future over-allocation is avoided.

205. Clause 3.17 provides direction for identifying take limits in order to meet environmental flows and levels. Of particular relevance is the requirement to state in its regional plan whether (and if so, when and which) existing water permits will be reviewed to comply

with environmental flows and levels, and the imposition of conditions on resource consents.[26]

206. Clause 3.28 set the following direction for water allocation and every regional council must:

a. make or change its regional plan to include criteria for:

i. deciding applications to approve transfers of water take permits; and

ii. deciding how to improve and maximise the efficient allocation of water (which includes economic, technical, and dynamic efficiency).

b. include methods in its regional plan to encourage the efficient use of water.

207. Clause 3.29 requires ORC to operate and maintain a freshwater quantity accounting system for every FMU and sets out specific requirements for how this is to be done. The purpose of the accounting systems is to provide the baseline information required:

a. for setting target attribute states, environmental flows and levels, and limits; and

b. to assess whether an FMU is, or is expected to be, over-allocated; and

c. to track over time the cumulative effects of activities (such as increases in discharges and changes in land use).

2.3.2. Proposed Otago Regional Policy Statement (pORPS)

208. Policy LF-FWP6A of the pORPS is relevant to achieving environmental flows and levels and take limits as provide direction to provide for ambitious and reasonable transitions in the use of land and water to achieve the long-term visions[27] by:

a. recognising that changes to practices and activities will need to occur overtime; and

b. managing the adverse impacts of implementing these changes on people and communities,

c. including by phasing implementation of new requirements and building on actions undertaken by catchment and other community groups, and

d. enabling innovation and the development of new practices.

209. Policy LF-FW-P7A provides direction for water allocation and use within limits and in accordance with environmental flows and levels, focusing on recognising the benefits of fresh water and either phasing out or avoiding over-allocation by:

a. managing over-allocation as set out in LF-FW-M6,

b. allocating fresh water efficiently to support the social, economic, and cultural well-being of people and communities to the extent possible within limits, including for:

c. community drinking water supplies,

[26] Clause 3.17(1)(c) and (d).

[27] LF-FW – Fresh water Chapter of the pORPS.

d. maintaining generation output and capacity from existing renewable electricity generation schemes,

e. mana whenua customary or cultural needs and activities, and

f. primary production,

g. ensuring that no more fresh water is abstracted than is necessary for its intended use,

h. ensuring that the efficiency of freshwater abstraction, storage and conveyancing infrastructure is improved,

i. providing for the harvesting and storage of fresh water to meet increasing demand for water, to

j. manage water scarcity conditions and to provide resilience to the effects of climate change, and

k. providing for spatial and temporal sharing of allocated fresh water between uses and users where feasible

210. Method LF-FW-M6 requires ORC to publicly notify the pLWRP, and after it is made operative, maintain the regional plan to address certain matters. The following of which is relevant to achieving environmental flows, levels and take limits:

a. implement the required steps in the NOF process in accordance with the NPSFM,

b. identify water bodies that are over-allocated and the methods and timeframes for phasing out that over-allocation (including through environmental flows and levels and limits) within the timeframes required to achieve the relevant long-term vision[28],

c. provide for the allocation and use of fresh water in accordance with LF-FW-P7A, including by

d. providing for off-stream water storage,

e. recognise and respond to Kāi Tahu cultural and spiritual concerns about mixing of water between different catchments.

2.3.3. Regional planning framework (Operative Water Plan)

2.3.4. Overview of Regional Plan: Water

211. The Water Plan contains provisions to implement the relevant minimum flows and levels and allocation regimes described in section 1.3.4 above.

212. A description of these provisions and associated issues are provided below.

213. These issues are categorised as follows:

a. Issues with the management of over-allocation

b. Issues with the setting of site-specific river flows (formerly residual flows)

[28] LF-FW – Fresh water Chapter of the pORPS.

c. Issues with the management of stream depletion effects

d. Issues with provisions for managing efficient water use

e. Issues with the framework for water metering and accounting

f. Issues with the framework for managing water conveyance and cross-mixing

g. Issues with the provisions for managing transfers of water permits

h. Issues with the management of non-consumptive takes

i. Issus with the protection of fish from entering water intake infrastructure.

2.3.4.1. Managing over-allocation

214. The Water Plan contains provisions that aim to avoid future over-allocation. This includes rules that prohibit the taking of water where allocation limits are exceeded or will be by a new water take. There are policies in the Water Plan to ensure that the allocation of water form rivers in the Waitaki catchment and managed by Otago are with the limits set by the Waitaki Catchment Water Allocation Regional Plan. The specific limits Waitaki Catchment Water Allocation Regional Plan are outside the scope of the development of the pLWRP.

215. The Water Plan also includes prohibited activities rules for the taking and use of water. These include:

a. New surface water takes where the allocation limit set under Policy 6.4.2 of the Water Plan is, or would be exceeded as a result of the proposed new take;

b. New groundwater takes from an aquifer identified in Schedule 4A where the allocation limit is, or would be exceeded;

c. New surface water takes from the Lindis River by three specified water races;

d. The take and use of water from Roto-nui-a-Whatu/Lake Tuakitoto from August to mid-May when the level of the lake is below a specified level.

216. The Water Plan provides some policy guidance on the review of resource consents to take water.[29] However, this is not directed towards achieving environmental flows or levels.

217. There is also limited direction on the term for which new consents should be granted in over-allocated water bodies. Instead, the main policy in the Water Plan that provides guidance on consent durations, Policy 6.4.19, outlines the different matters that are to be considered when setting consent durations.[30] This has led to an expectation of long-term consent durations and that the Council needs good reason to reduce the duration from the 35-year consent duration allowed for under Section 123 of the RMA.

218. There are several issues with the approach in the Water plan to manage over allocation namely:

[29] Policy 6.4.16

[30] The explanation to the Policy further states that "the duration of each resource consent to take and use water should have regard to the particular circumstances of the activity and its likely environmental effects, but there needs to be good reason for Council to reduce the duration of consents from that required for the purpose of the use".

a. The Water Plan does not recognise existing over-allocation, rather many catchments are only identified as fully allocated; [31]

b. Given that the water plan does not recognise existing over-allocation there is no strong direction or methods in the Water Plan for reducing allocation in water bodies where existing allocation has adverse effects on freshwater values. For example, there is limited direction on consent duration and consent review process to reduce over-allocation.

2.3.4.2. Setting site specific river flows

219. The Water Plan provides for the setting of specific river flows, currently referred to as "residual flows" in the operative Water Plan though the setting of conditions[32] on resource consents to take water on a case-by-case basis. These resource consent conditions are intended to provide for the aquatic ecosystem and natural character of the source water body. Residual flows conditions can apply in addition to a minimum flow and typically apply to water permits from tributaries that have different flow characteristics from the main stem under low flow conditions. Residual flows are set at the point of take on a case-by-case basis, to provide for the aquatic ecosystems and natural character of the source water body (Ravenscroft P. , 2023b).

220. There are several issues with the Water Plan approach to managing residual flows, namely:

a. The provisions in the Water Plan do not provide for all freshwater values, including the full suite of compulsory values set out in Appendix 1A of the NPSFM.

b. The Water Plan provides insufficient policy guidance for setting and enforcing residual flow conditions. For example, many residual flow conditions have no requirements to measure or monitor flows maintained below the point of take.

2.3.4.3. Managing surface water depletion effects of groundwater takes

221. The Water Plan manages groundwater with a hydrogeological connection to surface water as follows:

a. Any groundwater takes from an aquifer mapped in Schedule 2C is considered a surface water take and is subject to a minimum flow and surface water allocation availability;

b. Any groundwater take within 100m of any connected perennial surface water body is considered a take from surface water and is subject to any relevant minimum flow and surface water allocation limit for that surface water body.

c. Any groundwater take that is located 100m or more from a connected surface water body and depletes that surface water body by at least 5 Litres/second (L/s) is allocated as groundwater while the calculated stream depletion is also included in

[31] For example, many catchments are only identified as fully allocated based on the sum total of all consented takes and provisions to reduce allocation had been largely volunteer prior to plan change 7 where a method for determining the actual use of water during the consent replacement process was implemented.

[32] A residual flow is the amount of water that must be left in the river at the point of take

the total allocation from the connected surface water body, i.e. a dual allocation regime ("double accounting") is applied.[33]

222. In addition, a prescribed method for calculating stream depletion effects is provided in Schedule 5A of the Water Plan.

223. There are several issues with the current approach for assessing stream depletion effects in the Water Plan (Levy, Yeo, & and Ettema, Surface water depletion Memo, 2024a), namely:

a. The method for analysing stream depletion is too simplistic and does not appropriately consider the site's hydrogeological characteristics.

b. The method prescribes a pumping duration of 30 days. However, the pumping duration of most consented takes is much longer (i.e., >150 days)

c. Ignoring stream depletion rates of 5L/s or less has the potential to be detrimental to very small streams due to the cumulative impacts of these takes. For instance, the flow in a stream with rate of 100L/s that has five takes of 4L/s each will deplete it by 20L/s. However, this reduction in flow is not considered because these takes are not accounted.

d. The automatic classification of takes less than 100m away from a stream as surface water allocation is arbitrary and creates issues where there are no allocation limits under the Water Plan. This includes large rivers and lakes such as the Clutha river /Mata-Au and Kawarau River, Hawea river and Lake Dunstan, Lake Roxburgh.

2.3.4.4. Efficiency of water use

224. The Water plan provides some guidance on the quantity of water to be allocated to consents.[34] However, there is no clear guidance to determine what is reasonable or efficient for different uses and no strong direction or criteria to promote the efficient application or use of water.

225. Chapter 10A was implemented as part of plan change 7 and established a method for assessing and calculating the actual usage of water for any consent replacement.

226. The Water Plan recognises that water storage is a way to achieve more efficient use of water, and there is policy support for the storage of water taken during periods of highwater availability.[35]

227. The issues with the Water plan in relation to managing efficiency of water use include:

a. The Water plan does not provide clear guidance or criteria to promote the efficient application or use of water, and this is not considered to give effect to relevant policy direction in higher order planning instruments in relation to water allocation.[36]

[33] Policy 6.4.1A of the Regional Plan: Water for Otago

[34] Policy 6.4.0A, Water Plan.

[35] This include Polices 6.4.9 and 6.4.10 that establish the supplementary and further supplementary allocation regime.

[36] In particular clause 3.28, NPSFM

b. Further to this, there are several policies in the Water Plan intended to ensure that unused allocation is not being reallocated in consents for new or existing takes. [37] However, in practice these policies have had unintended consequences and incentivised a "use it or lose it" behaviour among some consent holders. This has encouraged some water users to ramp up their actual water use to demonstrate higher actual take records when applying for replacement consents, and leading, in many water-short areas, to more intensive farming and greater economic dependence on land uses reliant on irrigation (Skelton, 2019).

2.3.4.5. Water metering and accounting

228. There are provisions in the Water Plan that provide the Council with the ability to require that the rate of take be measured 'in a manner satisfactory to the Council'. However, there are no clear water metering or accounting requirements.

229. Accurate measuring and accounting for water use and conveyance is considered necessary to phase out existing over-allocation in Otago (Auspurger, Olsen, & and Dyer, 2024). This is due to the failure of the historic and current planning framework to effectively manage legacy issues present in Otago's water allocation. In many cases, stored water is consented, and metered as if it were primary allocation (Augspurger, 2023a). Under current practice, large on-stream dams are typically filled during winter or after large rainfall events which should be considered as high flow water and allocated to supplementary block(s). This water has already been "taken" and therefore should not be considered as primary, or low flow allocation. Failing to split stored water out of the primary allocation block means the primary allocation block is overly large (Auspurger, Olsen, & and Dyer, 2024).

230. An overly large primary block, consisting of stored water and run of river water, poses significant challenges for policies aimed at reducing allocation. To re-apportion stored water into appropriate allocation blocks, future plans must provide appropriate measures which distinguish stored water from run of river takes, such as separate metering. This re-apportioning would form the part of any allocation "reduction" in catchments with stored water. Therefore, the current planning framework is not considered fit for purpose to give effect to higher order planning instruments and to effectively manage misallocation or resolve over-allocation in catchments with large on-stream dams and instream water conveyance (Auspurger, Olsen, & and Dyer, 2024).

231. There are several issues with the Water plan approach to water metering and accounting, namely:

a. There is insufficient direction to measure and account for the complex nature of water use and conveyance in Otago.[38] For example, provisions in the Water plan do not enable ORC to impose consent conditions to distinguish between the taking of augmented flows or run-of-the -river flows.

[37] 6.4.2A, 6.4.10A4 and 6.4.18

[38] For example, there are many instances in Otago of freshwater being transported across a complex supply and conveyance network that includes open canals and raceways, artificial water courses, artificial lakes and piped infrastructure, as well as through natural water bodies. Often the use of natural water bodies as part of the conveyance network involves the cross mixing of water that has no natural connection.

b. The current provisions are insufficient to manage legacy issues, and to support the phasing out of over-allocation to achieve environmental flows, levels and take limits.

2.3.4.6. Water conveyance and cross-mixing

232. There are many instances in Otago where freshwater is being transported across a complex network of artificial water courses, piped infrastructure and natural water bodies. For example, water stored at the Loganburn Dam on Loganburn Creek, a tributary of the Taieri River in the Paerau Valley at the southern end of the Maniatoto Plain, is released from the dam into the Loganburn creek to supply more reliable downstream extraction for irrigation during time of demand and to maintain environmental flows (Ward & Russell, 2010).

233. Instream conveyance of water via natural water bodies can result in benefits and costs to the environment. For example, the discharge of relatively cool water into a river to supply a downstream point of take may support aquatic life during low flow periods by providing additional flow. Conversely, the release of relatively warmer water may have adverse effects on aquatic life. Further to this, the conveyance of water via natural water bodies may also change the instream habitat of freshwater species (e.g. through changes in flow velocity, temperature, risk of proliferation of invasive species) and alterations to the natural form and character (e.g. changes to natural flow patterns, riparian) of water bodies.

234. Further to this, Instream conveyance can modify natural flow regimes, and this can have impacts of freshwater values, with an increase in risk with the greater the flow modification resulting from instream conveyance (Richter, Davis, Apse, & Konrad, 2011).

235. The Water Plan has a suite of policies that seek to provide guidance for the management of complex water storage and conveyance networks that exists throughout Otago. There are policies to manage the use of natural water bodies as part of the conveyance network, including managing lakes levels, and the damming, diversion, and 'augmentation' of flows.[39] There are also rules for the taking of 'augmented flows'[40] and taking of water from artificial water courses.

236. Some types of water conveyance systems, enabled by the Water Plan have higher levels of water loss (e.g. through evaporation or filtration through the bed of the watercourse, historical wate races) than systems that rely on piped infrastructure. This means that often more water needs to be taken out of the river than what is needed for the intended use of that water. However, losses can be highly variable depending on the individual conveyance network. For example, unlined race losses are highly variable depending on the age of the system, material of the races, and operation of the race system and losses range from 10% to over 80% (Johnson, 2023).

237. There are several issues with the current management framework in the Water Plan, namely:

a. The current planning framework has enabled the cross-mixing of water which has significant cultural impacts on Kai Tahu values.

[39] See policies 6.5.2-6.5.5

[40] For example, rule 12.1.4.1 provides a restricted discretionary activity pathway for takes of augmented flow.

b. There is insufficient guidance to manage the effects of water conveyance and cross-mixing.

c. The current framework fails to ensure the existing network of water conveyance and storage infrastructure is managed in line with policy direction in higher order planning instruments. Particularly regarding direction in relation to water efficiency and water quantity accounting. For example, there is limited guidance to improve historical water conveyance infrastructure.

d. There are no provisions to manage elements of water conveyance in order to distinguish between the taking of augmented flows or run-of-the -river flows or to determine water loss through evaporation. This has impact on existing water users as water released to supply a downstream point of take may be intercepted prior to by another water user as a run-of-river take.

2.3.4.7. Transfers of water permits

238. The Water Plan contains limited policy direction on the management of water permit transfers, and there is no rule framework.[41]

239. There are several issues with the approach to managing water permit transfers in the water plan, namely:

a. The Water plan lacks a clear policy and rule framework for managing transfers.

b. There is no direction or criteria for the transfer of water permits in over-allocated water bodies.

c. Given this lack of criteria, the current planning framework is considered not fit for purposes and to not give effect to higher order planning instrument.[42]

2.3.4.8. Managing non-consumptive takes

240. The Water Plan does not specifically provide for non-consumptive water takes. However, the Water Plan's glossary includes the definition of 'non-consumptive water take' included in the Resource Management (Measurement and Reporting of Water Takes) Regulations 2010.

241. Under the Water Plan, non-consumptive takes are discretionary activities under Rule 12.1.5.1 if they cannot meet any of the other rules in the Water Plan. When granting consent, ORC may impose conditions under s 108 of the RMA. Under current practice and policy a non-consumptive take is not subject to any applicable take limit.[43]

242. The following issues were identified with the approach to managing non-consumptive takes in the Water Plan:

a. The Water Plan does not provide clear guidance to assess the key elements of the definition of non-consumptive such as 'at or near location of take' and 'no significant delay.' This creates uncertainty for decision makers and water users.

[41] Policy 6.4.17, 6.4.0A and 6.6.1.

[42] In particular, cl 3.28(1)

[43] For example, policy 6.4.2(b)(ii)(2).

b. Past consenting practice has not focused on the characteristics of a particular water body and the effects of the take but rather been based on a presumption that certain activities that involve the taking of water are non-consumptive in nature.

c. This presumption is not always consistent with the definition of 'non-consumptive' under the clause 4 of the Resource Management (Measurement and Reporting of Water Takes) Regulations 2010. For example, in the past there has been a presumption that certain types of hydro electricity generation are non-consumptive.

2.3.4.9. Protecting fish from water intakes

243. The Water Plan does not contain policy direction to protect fish from water intakes but does include conditions and matters of consideration to prevent fish from entering the intake structure in the rule framework for surface takes. This includes conditions in some permitted activity rules to take and use surface to prevent fish from entering the intake structure, and matters of control or discretion in controlled activity rules and restricted discretionary active rules to consider any need to prevent fish entering the intake.[44] The need to prevent fish from entering fish water intakes is considered during the resource consent application process.

244. There are several issues with the approach to protecting fish from water intakes in the Water Plan, which relate to the lack of clear direction to water users or decision makers on why, where or how fish are to be protected from water intakes.

2.3.4.10. Summary

245. As described above, the provisions of the Water Plan that manage the topics in this section are considered relevant to achieving the environmental flows, levels and take limits. Several issues were identified for all topics and these largely do not give effect to policy direction and requirements of higher order planning instruments.

2.4. Objectives

246. Section 32(1)(b) requires an examination of whether the provisions in a proposal are the most appropriate way to achieve the objectives. The objectives relevant for this topic are:

a. All of the objectives in the IM – Integrated management chapter, and

b. All of the environmental outcomes included as objectives in chapters FMU1 to FMU5 (including chapters CAT1 to CAT5); and

c. EFL-O1 - Efficiency

2.5. Options development

247. The option for each topic in this section have been developed to give effect to the policy direction received through the plan making process and include input from:

a. Higher order planning instruments.

[44]See rules 12.1.2.2, 12.1.2.4, 12.1.2.5, and 12.1.3.1

b. Internal review of the Water Plan, and the identification of issues and option by ORC staff.

c. Policy direction received from ORC's Environmental Science and Policy committee and ORC council.

d. Community and iwi engagements as part of the NOF process including draft provisions.

e. Stakeholder engagement.

248. As discussed in chapter 4 of this report, the during the third round of community engagement on the draft LWRP ORC staff sought feedback on the summarised draft provisions from the community and stakeholders. The relevant feedback received on each topic is summarised in the evaluation of provisions in subsequent section.

2.6. Summary of proposal and assessment

249. The topics in this section are all relevant to achieving the environmental flows, levels and take limits proposed for all water bodies in Otago. In particular, the topics aim to ensure freshwater is allocated and used efficiently, and that all existing over-allocation is phased out, and future over-allocation is avoided as required by policy 11 of the NPSFM. These topics are all connected and should be considered as a package of provisions to achieve the relevant objectives. This section provides a summary of the proposal and assessment and introduces some case study examples of some of the likely costs and opportunities that are anticipated and where they are like to occur. This summary provides context and a refence point for further the evaluation of the provisions for each topic in each subsequent section.

250. As described in section 1.6 above, the proposal includes setting bespoke environmental flow, levels and take limits for some water bodies in Otago. These proposed bespoke allocation regimes have been developed in accordance with NOF process under the NPSFM to achieve the environmental outcomes for the FMU and rohe that the water bodies are a part of. Some water bodies in Otago, particularly some of the bespoke rivers, have been identified as over-allocated in relation to water quantity, where the proposal sets:

a. environmental flows or levels that are not being achieved as there is either no existing mandatory minimum flow in place or the proposal is for higher minimum flows than the existing flow regime set in the Water; and/or

b. take limits that are exceeded by the current sum of all consents in these catchments.

251. The scale of over-allocation varies by water body and depend on the complexity of the existing allocation regime and the degree of change required to achieve the proposed flow, levels and take limits. This can depend on the level at which a take limit is exceeded and any necessary reductions in allocation required, or the steps required to implement the proposed minimum flows.

252. In catchments where the proposal is likely to require a change to existing water use practices, a staged approach to implementing environmental flows, levels and take limits is proposed. This includes the staging of dates from which flows and limits take effect and the combination of the consent replacement and consent review process to ensure an equitable approach is taken to all existing water users.

253. For some catchments the transition may be less onerous and require limited reduction in allocation. Whereas, for other catchments the pLWRP provides the first steps in implementing requirement such as minimum flows, or necessary reduction in allocation as existing resource consent are replaced. However, it is acknowledged that further step and work is need in some catchments beyond what is proposed in the pLWRP. For example, the proposal sets interim take limits at the sum of allocation to existing resource consents in catchment to provide the transition to bespoke limits, or as a temporary approach in catchments where long term take limits cannot be identified prior to notification of this plan.[45] Case study 1 below provides a summary of the proposal for the Manuherekia catchment and demonstrates the opportunities and challenges associated with phasing out over-allocation in one of Otago most complex catchments.

2.6.1. Where are impacts and opportunities anticipated to occur?

254. The benefits in achieving the environmental flows, levels and take limits, and ensuring sustainable water quantity management will be discussed in the evaluation of provisions in each topic. However, it is acknowledged and anticipated that there will likely to be costs for existing water users in some catchments as result of the proposal.[46] The scale and extent of potential costs will vary across different catchments depending on the impacts of the proposal on water availability and reliability, existing land use and demand, as well the opportunities and actions available to minimise or avoid the impacts on water users. See case study 1 below for a discussion on the impacts of different actions.

255. Potential actions to reduce or avoid the impacts of the proposal include:

a. Infrastructure investment including more technically efficient irrigation, water conveyance and water storage,

b. High flow harvesting and water storage,

c. Alternative water sources,

d. Land use change including less water intensive activities or reduced production,

e. Planning and investment in collective and collaborative management of water resources.

256. The table below identifies the catchments where bespoke minimum flows are proposed in the pLWRP that are either higher than the current minimum flow in the Water Plan or where there is currently no minimum flow in place for the catchment. To assess the potential impacts of these proposed minimum flows on existing water users, a 'naturalised flow' records[47] has been determined for each catchment (Stewart D. , 2024). This

[45] For example, for the Taiari River and Manuherekia River interim take limits are proposed as temporary approach as future work is planned to determine the appropriate long term take limits in accordance with the NPSFM.

[46] For example, higher minimum flows in some catchments may decrease the reliability and availability of water supply for existing water users.

[47] A 'naturalised flow record' is created by adding metering data of water takes back into the flow recorded at a flow monitoring site. For each of the sites analysed, the daily data were naturalised by either:

Adding abstractions back into the flow record (Kakanui River. Kauru River, Luggate Creek, Pomahaka River, Waipahi River) or: Calculating a synthetic flow record for the sites where the adding in of abstractions was not possible (Arrow

assessment provides an indication of how restrictive the proposal would have been during 'irrigation season'[48] by demonstrating the periods under 'natural' flow conditions that would have:

a. No restriction on water takes (100% of the take limit available),

b. partial restrictions in place (less than 100% up to 50 % of the take limit available, and 50 % or less of the take limit available),

c. complete shutdown of irrigation when the river was at or below the proposed minimum flow.

257. An analysis of the naturalised flow record provides a useful overview of past conditions to infer potential impacts, however, it is not full prediction of the future impacts of the proposal. For example, it does not consider potential measures taken by water users to collectively manage restriction such as a roster on water takes to reduce water restrictions as rivers dropped towards the minimum flow. Further to this, the record and analysis provides a theoretical basis for the likelihood of restrictions on water take and it must be recognised that is unlikely that all water users will exercise their maximum rate of take at one point in time.

River, Cardrona River, Low Burn). Note that recent data for the Arrow and Cardrona were naturalised by adding the abstractions back into the flows.

[48] For the purposes of this analysis the 'irrigation season' is from 1 September to 30 April

Table 25: Catchments where bespoke minimum flows are proposed in the pLWRP that are either higher than the current minimum flow in the Water Plan or where there is currently no minimum flow in place for the catchment.

River	Current situation	Naturalised flow record								Number of resource consents
		% days no restrictions (≥100%)	% days Partial restriction (100% >50%)	% days Partial restriction (≤ 50%)	% days complete shutdown	Irrigation seasons where minimum flow reached	Average number of complete shutdown event**	Average period of complete shutdown (days)	Longest period of complete shutdown (days)	
Arrow River	No minimum flow	77%	17 %	5 %	Less than 1 %	1 out of 11	4	2	6	14*
Cardrona River – upstream of Mt Barker	No minimum flow	85%	7.3 %	5%	2.7%	7 out of 24	3	8	17	65*
Cardrona River – downstream of Mt Barker	No minimum flow	99 % 2406/2420	0 %	0.1 %	Less than 1 % 12/2420	1 out of 10	3	6	10	
Kākaunui River	Minimum flow in place[49]	79 %	8.5	9%	3.5%	6 out of 14	5	4	12	19*
Kauru	No minimum flow	76.8%	13.1 %	1.6 %	8.5 %	6 out of 7	4	6	32	3
Low Burn	No minimum flow	43.9 %	38.7 %	17.3 %	0	0	0	0	0	17*
Luggate Creek	Minimum	80.2%	5.8 %	14%	0	24 out of	0		0	4

[49] no full shutdown of irrigation because the existing minimum flows are less than the lowest flow likely in this river under natural conditions and the irrigators roster their water takes to ensure the minimum flow is not breached.

River	Current situation	Naturalised flow record								Number of resource consents
		% days no restrictions (≥100%)	% days Partial restriction (100% >50%)	% days Partial restriction (≤ 50%)	% days complete shutdown	Irrigation seasons where minimum flow reached	Average number of complete shutdown event**	Average period of complete shutdown (days)	Longest period of complete shutdown (days)	
	flow in place									
Poumāhaka River – Waipahi	No minimum flow in place	45.3 %	45.5 %	1.5 %	7.7 %	9 out of 12	2	9	37	3
Manuherekia River	No minimum flow[50]	n/a – naturalised flow record for the purposes of this assessment is not practicable given the highly modified flow regime and release of water from Falls Dam (see table X in case study below).								65

[50] There is a voluntary minimum flow of 900 l/s.

258. Table 25 above indicates that the proposed minimum flows in some catchments will likely reduce the availability and reliability of water during the irrigation season for water users compared to the current settings.

259. The naturalised flow record for the Kakanui/Kakaunui indicate that under 'natural' flow conditions during the period from 2010 to 2024, Irrigation restrictions would have increased and complete shutdown would have occurred in 6 out of 14 seasons As an indication of severity of these events, there was on average 5 complete shutdown events in the seasons where these occurred, average a period of 4 days with the longest period being 12 days. This illustrates that the proposed minimum flow will likely decrease the reliability of water supply, particularly during drier irrigation seasons.

260. The naturalised flow record for the Cardrona upstream of Mt Barker indicates a more restrictive flow regime for the upper reach of this catchment. Complete shutdown events occurred in 7 of the 24 irrigation seasons on record under the proposed minimum flow of 750 l/s. A more restrictive flow regime is consistent with general results from the modelled scenarios undertaken by Harris (2020) when the flow regime for managing the Cardrona River were reviewed. The Harris (2020) report indicated that a minimum flow scenario of 750 l/s would result in a more restrictive flow regime to meet irrigation demand. With some of the potential costs of the 750 l/s scenario on the existing irrigation practices including an on average 5 % increase in volume restrictions and a nearly 5% reduction of pasture growth on average, and approximately 13 % of pasture growth would be lost every 1 in 10 years. The average results show a small average decrease in operating profit, however, that impacts are greater during larger dry periods (Harris, 2020).

261. In contrast to the potentially restrictive regimes above, the naturalised flow record indicates that, for some catchments, there will likely not be a significant increase in restrictions. This is the case for the Arrow River, where a complete shown only occurred in 1 of the 11 irrigation seasons, and Lowburn Creek where a complete shutdown did not occur during the naturalised flow record.

262. In complex catchments such as the Manuherekia, it is much more difficult to determine the potential impact given the complex hydrology of the catchments, land use and potential actions available in the catchment. Case study 1 below provides summary of the process an assessment of the proposal to illustrate this complexity.

263. In 2021 ORC modelled the impacts of different flow scenarios and estimated the effects on irrigation reliability as follows:

    a. 95% under the status quo,

    b. 91% reliability for existing irrigation sourcing water from schemes, and 80% for run of the river takes for the proposed flow of 1200 l/s from 2030,

    c. 78-9% for existing irrigation sourcing water from schemes, and 69% for the main tributaries for the prosed flow of 2500 L/s from 2040 (Otago Regional Council, 2021c)

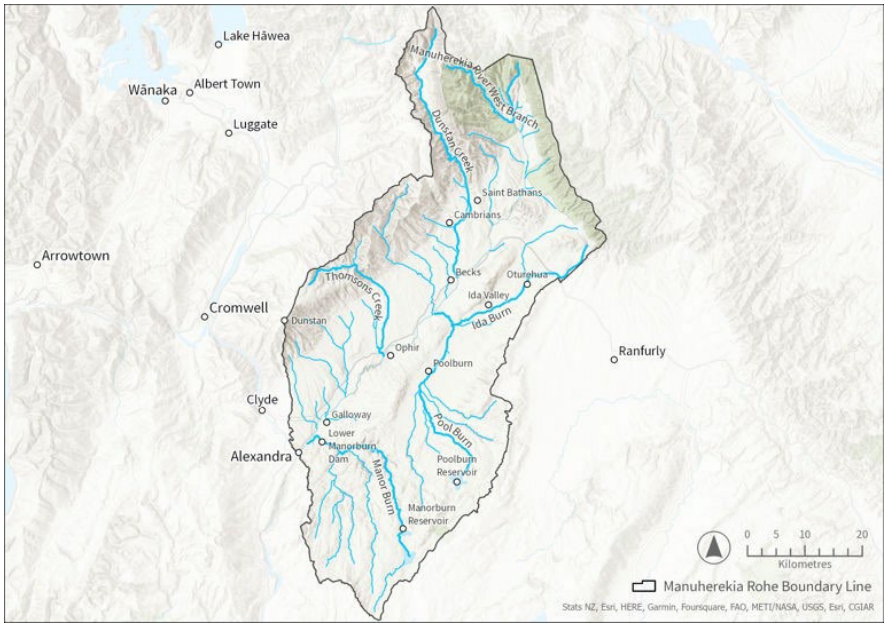
264. Given these impacts on irrigation reliability, increases in the minimum flow from the status quo to the propped minimum flows in 2030 and 2040 are likely to have the overall effect of reducing water availability and security for irrigation, drinking water supply, and stock water uses. In the absence of actions such as infrastructure investment, new water storage or land use change, enterprise viability and land values are likely to be severely stressed.

However, ORC also modelled the impacts on the district GDP and employment and estimated the overall impact to likely be low based on the 2500 l/f flow scenario (Otago Regional Council, 2021c).

Table 26: Case study 1: Manuherekia catchment

Case study 1: Manuherekia catchment

The Manuherekia River flows from its headwaters in the Hawkdun, St Bathans and Dunstan Mountain ranges over 85 km in a south-west direction towards Alexandra where it joins the Clutha Mata-Au River. The Manuherekia rohe is approximately 3,000km^2.



The semi-arid climate of the Manuherekia is characterised by cold winters and warm, dry summers. Rainfall in the region is low, with an annual median between 350 and 500 mm in the valley floors and up to 1,000 mm in the surrounding ranges (Olsen, Lu, & and Ravenscroft, 2017). The area is dominated by pasture grasslands on the flat and gently sloping land, while tussock grasslands are common in the high country.

Complex hydrology and land and water use

Flows and the distribution of water in the Manuherekia catchment are highly modified. Water races, along with natural water courses, are used to convey water for irrigation, stock water and domestic supplies. This has created an expansive and complex distribution network that moves water around the catchment.

Falls Dam in the upper catchment of the Manuherekia River mainstem stores approximately 11 million m^3 and supplements takes along the mainstem. Dams in the Pool Burn and upper Manor Burn store approximately 70 million m^3 of water in total but given the low yield from these catchments the stored water is used sparingly. The storages provide the bulk of water that is used to irrigate the Ida Valley.

Water is taken from the river, tributaries and aquifers in the Manuherekia rohe:

- to irrigate about 27,000 hectares of land (about 18,000 hectares in the Manuherekia Valley and 9,000 hectares in the Ida Valley). Most of the irrigation water is distributed through six major irrigation schemes,
- for town water supply to Omakau, Ophir and Naseby and individual domestic supplies,
- for stock drinking water.

Modelled irrigation water use for the entire catchment, that is the Manuherekia Valley and the Ida Valley, averages 15.7 percent of average annual yield. For the Manuherekia valley alone the average annual water used for irrigation is 11.1 percent. Approximately 1/6th of the water used for irrigation in the Manuherekia Valley comes from stored water for the purpose of augmenting over the irrigation season. For the whole catchment, about 1/3 of the total supply comes from stored water. For the Ida Valley, about 2/3 comes from stored water.

The flow in the Manuherekia River is strongly influenced by the release of water from Falls Dam and water takes. In summer, when flows are naturally lower, the effect of water takes means that flow decreases in a downstream direction, which is the opposite of natural flows. The change in flow is best illustrated with a flow schematic in Figure 6 below. The orange line is estimated natural flow from Falls Dam outlet to Campground, and the blue line is the flow with abstractions (water taken for irrigation)

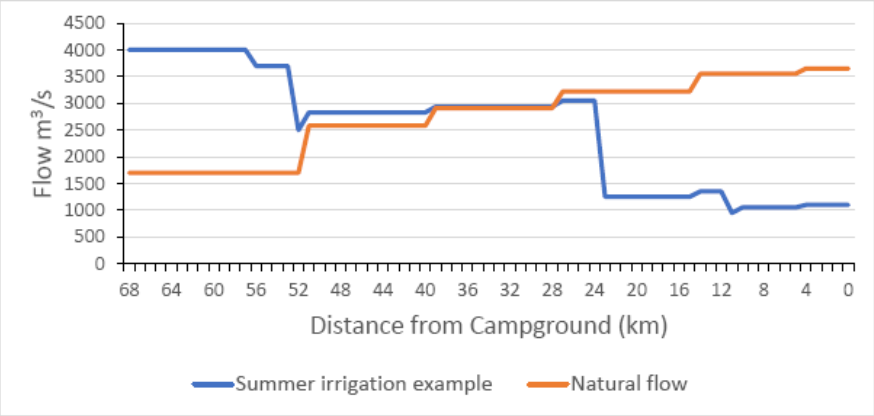


Figure 6: A longitudinal diagram of flow in the Manuherekia river source: Allibone (2021)

Summary of proposed minimum flows and take limits in pLWRP

The proposal for the Manuherekia catchment is to:

- Stage the increase in minimum flows over time to achieve ecosystem health for the river as follows:
  - 900 l/s minimum flow, measured at campground, at the date of notification.
  - 1100l/s minimum flow, measured at campground, from 2028;
  - 2500l/s minimum flow, measured at campground from 2040.
- Call in all water take consents that expire after 2030 for review and apply the 1200l/s minimum flow. This would be done to ensure that all water abstractors were subject to the same minimum flow and to ensure the minimum flow is able to be achieved.
- Set an interim take limit based on the sum of all resource consents to allow for reconsenting.
- Set environmental flow for the following tributary/sub-catchments:
  - Dunstan Creek;
  - Lauder Creek;
  - Thomsons Creek;
  - Chatto Creek;
  - Manor Burn; and

Development and assessment of the proposal for setting environmental flows and take limits

The process to establish provisions to manage water quality and quantity in the Manuherekia rohe has been extensive. In particular the water quantity work has been ongoing since 2016 and involved a considerable investment of time and money from the community, and ORC staff.

The Manuherekia Technical Advisory Group was formed to recommend a minimum flow and provided updated information in relation to the hydrology and ecology of the river, and the flows required to support a healthy ecosystem and has informed the policy provisions in for engagement in 2023.

Within this process there have been extensive and detailed studies undertaken to inform the flow regime and water quality attribute targets for the Manuherekia catchment. These studies covered a wide range of values and included:

- Habitat and ecology,
- Natural character,
- Recreation,
- Farm economics,
- Catchment economics,
- Regional economics,
- Cultural values,

- Climate change,
- Water quality.

A Cultural Flow Preference Study (Tipa, 2021) was undertaken in the Manuherekia catchment to determine the river flows that mana whenua believe would be sufficient to protect cultural interests and restore cultural use. The Kāi Tahu recommendation in 2021 for the minimum flow at Campground was 2,500 l/s to 3,100 l/s in summer and 4,300 l/s in winter, with one or more freshes in summer of at least 4,300 l/s for at least 48 hours required to support ecosystem health. Minimum flows not less than 90% 7-day MALF for tributaries are also recommended, with flows from tributaries being proportionate to the naturalised flow pattern.

Following consideration of all the above and ensuring alignment with the hierarchy of obligations in Te Mana o te Wai, staff recommended a package of water quality and quantity provisions for the Manuherekia rohe, in addition to the region wide provisions that will apply (Dawe, 2023)(Dawe, 2023). This package was presented during the third round of community engagement in the Manuherekia rohe. The feedback received during community engagement included a wide range of views in support and opposition of the proposal. This included different preferences for different flows and the time frames for implementation.

Economic impacts of the proposal

Three reports (Glennie & Harburg, 2021; Wynne-Lewis, 2021; and McDonald & Young, 2021) together form the economic assessment undertaken for the Technical Advisory Group to evaluate the impacts of 5 minimum flow scenarios (900 l/s, 1,500 l/s, 2,000 l/s, 2,500 l/s, and 3,000 l/s) that were presented during community engagement.

Case studies: Pastoral Farms

The assessment centred on 3 farm models: a 300 ha dairy farm, a 359 ha dairy support farm and a 720 ha sheep and beef cattle farm. The farm models were based on real farms within the Manuherikia Catchment and configured for 2 or 3 locations (Omakau, Lauder, and Alexandra) within the catchment depending on the farm type. The farm modelling focused on management decisions (e.g. buying in feed during periods of shortfall and selling trading stock) triggered by feed supply and animal demand. Feed supply was determined by monthly pasture growth from 1973 to 2020 based on historic climate data and irrigation availability.

The main finding of the farm-level modelling (Glennie & Harburg, 2021) was that currently pastoral farms are generally challenged by their irrigation reliability. Reductions in reliability as a result of minimum flow scenarios above 1,500 l/sec were likely to threaten the viability of typical pastoral farms within the catchment.

This was particularly the case for the sheep and beef farm modelled because of a greater reliance on dryland area and so variability in profitability. Detailed results for farm operating profit and land values are available in the report: *Manuherekia Enterprise Model Methodology* (Glennie & Harburg, 2021). There was no consideration of land use change.

The ability of a vulnerable farm to manage a shortfall will be constrained by:

- Potential impacts on land values impacting farm balance sheets and constraining borrowing capacity.
- Potential need to borrow funds for capital works to offset the reduction in reliability.
- Willingness of lenders to maintain or increase lending under the sudden reduction in profitability, increased variability of returns, and potential reduction in land values.
- Increased sales of farms in response to the restrictions could impact land values and further constrain balance sheets.
- Higher levels of restriction result in more years where the average farm business is unprofitable, as well as greater financial losses incurred in these years. The risk of back-to-back dry seasons, or an extreme dry season, increased with the level of irrigation restriction.

Case study: Cherry grower

On the advice of a prominent grower, the assessment for the Technical Advisory

Group also evaluated an increase in water storage capacity for a cherry growing operation at Alexandra. The increased storage was that needed to achieve full irrigation reliability for each minimum flow scenario using monthly water harvesting forecasts. The increased storage was modelled as a one-off capital expenditure impact using indicative storage construction costs. A vineyard was not included in the assessment

Water storage costs vary greatly according to the volume of material needed to be shifted to achieve a specific storage volume. The estimated storage cost per unit volume used was $\$10/m^3$. However, storage was unlikely to be a viable option where insufficient suitable space exists because of the high value of horticultural land in crop. For the higher minimum flow scenarios the additional water storage needed was around 3 times the existing volume, placing pressure on space as well. Crop demand for cherries is met to the end of January but other summerfruit crops, as well as grapes and pipfruit, will have different needs in terms of amount and timing of water.

Flow-on impacts

The results for the pastoral farm models (but not the cherry grower) were scaled up to the Manuherekia Catchment for a 'wet' year, an 'average' year, and a 'dry' year (Wynne-Lewis, 2021). They were used in an input-output model to estimate how the changes in farm income, expenditure and commodity production will have direct, indirect, and induced flow-on impacts over a 20-year period (McDonald & Young, 2021) for:

- the Manuherekia Catchment,
- the rest of Central Otago,
- the rest of Otago, and
- the rest of New Zealand.

In general terms, there were two main findings from the input-output modelling (McDonald & Young, 2021). First, the negative impacts on value add and employment generally increase as the minimum flow volume increases. Second, the overall impacts for a 'dry year' tend to be less than those for an 'average rainfall' year. This finding partly stems from the changes in the production of commodities (e.g., raw milk, meat) in the farm-level modelling. Third, the distributional impacts vary by catchment, district, and region. Detailed results for value-added and employment are reported in: *Economy-wide Impacts of Proposed Policy Options for the Manuherekia Catchment* (McDonald & Young, 2021).

The negative impacts are mainly felt within Manuherekia while any positive impacts tend to occur in the rest of Central Otago, due to farmers buying commodities and services from neighbouring areas (e.g., supplementary feed, construction and design services for new water storage). At 1500 l/s minimum flow option level, in an 'average rainfall' year there is a slight fall in value-added for the much larger Otago and New Zealand economies as commodities supplied to processors reduce and income-induced expenditure falls.

Several important assumptions were made in the Technical Advisory Group assessment that influence these findings, including:

- A sudden imposition of a higher minimum flow rather than being phased in over time, which is the approach in the pLWRP.
- Pastoral farms in the Manuherekia will continue to buy more inputs in dry years, which reduces farm profitability within the catchment (as well as household income and expenditure) but has a stimulating effect for suppliers who are largely outside the catchment.
- Industries supplying the Manuherekia Catchment will be able to expand to meet increased demand for commodities and services. However, it may not be realistic if constraints also existing outside of the catchment.

2.6.2. Potential action - Water sharing/collective management

265. Harris (2021) found that existing use of the available allocation in the upper reach the Cardrona River was relatively low (about 22%) so it was assumed that allocation limits in the upper reach will not impact on reliability for users as they will be able to self-ration and organise to take at different times. This suggests that water sharing is a viable action in the upper reach of the Cardona River to reduce the impacts of reduced allocation and a more restrictive flow regime. In particular, where water demand needs to be managed to ensure a minimum flow is not reached and a complete shutdown in place.

266. Similarly, in the K**ā**kaunui/Kakanui River, water sharing, and collective management of water takes is a likely a viable action to reduce some of the impacts. Currently the Kakanui allocation committee alongside water sharing arrangements between exiting water users roster there takes to managed available water to ensure minimum flows are not reached. For example, groups of irrigators take water over alternative periods, such as 12 hour, and 24 hours periods and so on at increasingly long intervals as water availability dictates (Ward & Russell, 2010).

2.6.3. Potential action – Alternative water sources

267. Alternative water sources with high levels of reliability of supply and further allocation available are a viable action available to water users in some catchments. In the Kakanui/Kākaunui River the supply of water from the Waitaki catchment as supplied by the North Otago Irrigation Company is a potentially viable action. Although this action is dependent on the availability of shares and comes at an increased cost to purchase shares and the on-going fixed and variable charges paid monthly by shareholders. The impacts of such costs to affected water users, are somewhat minimised by the benefits of improved reliability and certainty of water supply.

268. In other catchments, such as the Cardrona river there are alternative water sources available in some parts of the catchment such as ground water to reduce the impacts of the proposed flows. For example, in the middle reach of Cardona the proposal makes no surface water allocation available, and the impacts of this are reduced and mitigated by existing surface water takes from the Cardrona river converting to groundwater takes from the Wanaka-Basin/Cardrona Gravel Aquifer.

269. For some catchments in parts of the Clutha Mat-au FMU that are close to Clutha Mata-au mainstem there is also the potential to source water from the main stem. For example, this is a potentially viable action in parts of the lower Lindis River, Lower Manuherekia, Lowburn Creek. Although the viability of this action will depend on the distance, and scale of costs associated with planning, developing and installing the appropriate water intake, conveyance and storage infrastructure to deliver the water.

2.6.4. Action – High flow harvesting

270. High flow harvesting of water and water storage is an action that can reduce the impacts of a more restrictive flow regime. However, the viability of this mitigation will vary depending on the availability of high flow allocation (B blocks), and the suitability of the topography and geology for the construction of off stream dams for water storage (MPI, 2021)

271. In the Kakanui/Kakaunui, there is also high flow allocation available from through B block allocation regime proposed in the pLWRP, although there is currently limited off stream water storage infrastructure present in the catchment. Conversely, for other catchments such as the Cardona River there is limited potential for off stream storage dams that will allow individual landowners to directly irrigate their property during periods when minimum flow are in effect. This is due to the topography and seismic risk of the area (GeoSove Ltd, David Hamilton and associates Ltd, 2017). For example, many of the viable gully dam sites in the Cardrona catchment are limited by the generally steep terrain and unfavourable geology (GeoSove Ltd, David Hamilton and associates Ltd, 2017).

272. For other catchment the availability of high flow allocation and with suitable land for off stream storage dams may reduce the impacts of more restrictive minimum flows. For example, the Luggate Creek catchment has been identified as a catchment with potentially suitable land for off-stream water storage, and with available B block allocation (GeoSove Ltd, David Hamilton and associates Ltd, 2017).

Case study 27: Economic impacts of different actions for different land uses

Case study 2: Economic impacts of different actions for different land uses

Since the TAG's economic assessment for the Manuherekia Catchment, in-depth economic research was undertaken for Otago by an Industry Advisory Group as part of Otago Regional Council's Economic Work Programme (refer to Section 4.3). This research first characterised sheep and beef farming, deer farming, arable farming, dairy farming, horticulture, and viticulture across the region (Moran (Ed.), 2022). It then tested the impacts of environmental actions for individual farms and growers across the region (Moran (Ed.), 2023). Included in this research were topics relevant to the impacts of setting a minimum flow in the Manuherekia Catchment – although those related to pastoral farming focused on improving efficiency rather than reductions in water use. In general, where upgrades resulted in more efficient water use then water takes were reduced. Table 26 below provides references for specific case studies from this research relevant to achieving minimum flows in Otago. There are also numerous discussion points on irrigation throughout the two reports.

Table 28: Case study references relevant to minimum flows in Otago's rural businesses and environmental actions for fresh water (Moran (Ed.), 2023)

Land use	Report reference (Moran (Ed.), 2023)	Topic
Sheep and beef farming	Section 2.5.5	Upgrading to more efficient irrigation
Deer farming	Sections 3.5.3, 3.5.4, and 3.5.5	Upgrade to more efficient irrigation
Dairy farming	Sections 5.6.6 and 5.6.10	Upgrade to more efficient irrigation
Horticulture	Sections 6.7.1	Reductions in irrigation water
	Sections 6.7.4	Rootstock survival water
Viticulture	Section 7.5.2	Restrictions on access to water for frost fighting
	Section 7.5.3	Reducing consented water takes for vineyards

2.7. Sub-topic: Managing over-allocation

273. Policy 11 of the NPSFM requires that freshwater is allocated and used efficiently, and that all existing over-allocation is phased out, and future over-allocation is avoided.

274. The provisions proposed in the EFL chapter avoid future over-allocation by setting environmental flows, levels and take limits for water takes that must be complied with and that cannot be exceeded.

275. The water bodies identified as over-allocated[51] in the pLWRP are:

a. bespoke river catchments where the proposed take limits set in the pLWRP are exceeded by the current level of consented allocation; and/or where the long-term minimum flow has not been implemented; and

b. aquifers where the total volume of water allocated exceeds the take limit set in the pLWRP.

276. According to the criteria above, the 35 catchments in Parts 2,3 and 4 of SCHED3 – Rivers: A Block environmental flows, levels and take limits and the Sandy Point and Maungawera Valley aquifers have been identified as over-allocated. However, it is worth noting that while these 2 aquifers the current sum total of resource consent exceeds the proposed take limit, the estimated actual use of water is within the proposed take limits (Levy, Yeo, & Ettema, 2023; Dumont, Rekker, & Etheridge, 2023).

2.7.1. Discounted options

277. For this topic, the status quo is not considered a reasonably practicable option for the reasons identified above in the 'Overview of the Regional Plan: Water' section above.

2.7.2. Reasonably practicable options

278. Two reasonably practicable options were identified to phase out over-allocation and achieve the objectives relevant to the EFL chapter:

a. **Option 1**: Proportional reduction upon consent replacement.

b. **Option 2**: 2-stage approach (preferred option).

2.7.2.1. Option 1: Proportional reduction upon consent replacement

279. Option 1 proposes to reduce water allocation within the proposed take limits through mandatory reduction of allocation that is proportionate to the overall reduction required. Mandatory proportional reduction will occur through the consent replacement process and

[51] Clause 1.4(1) of the NPSFM defines over-allocation, or over-allocated, in relation to both the quantity and quality of freshwater, to mean the situation where:

(a) resource use exceeds a limit; or

(b) if limits have not been set, an FMU or part of an FMU is degraded or degrading; or

(c) an FMU or part of an FMU is not achieving an environmental flow or level set for it under clause 3.16.

will be applied to all water permit holders when they apply for a water permit replacement.

280. Under this option, only existing water users can apply for water permits through the consent replacement process in waterbodies identified as over-allocated as new applications are not allowed as these will further exceed the take limit.[52]

281. Proposed environmental flows and levels such as bespoke minimum flows that are not currently in force will be implemented through a combination of consent replacement and consent review processes.

2.7.2.2. Option 2: 2-stage approach (preferred option)

282. Option 2 proposes a 2-stage approach (where required) for the phasing out of over-allocation within the time frame required to achieve the relevant long-term visions.[53]

283. This option utilises a suite of "sinking lid" provisions alongside stepped requirements to implement environmental flows, levels and take limits to reduce over-allocation by specified time frames. This sinking lid polices and method include interim take limits set as the sum of all resource consents to take water. This approach is necessary given that for some water bodies where:

a. it is not possible to set long term take limits due to the complexity of the catchment's hydrology and current allocation regimes prior to notification of this plan and/or without the provision proposed in the LWRP; or

b. there are long term take limits proposed in the LWRP, but the current sum of allocation exceeds the proposed limits and a transition is needed to allow for the replacement of existing consent.[54]

284. Option 2 shares some commonalties with the approach set out in Option 1. Firstly, the proposed environmental flows and levels that are not in force will be implemented through a combination of consent replacement and consent review processes. Secondly, new takes water take in over-allocated water bodies are a prohibited activity unless they are non-consumptive, and only existing water users can apply for water permits through the consent replacement process as new applications are not allowed as these will further exceed the take limit.

285. During stage 1, most consent replacements will occur for existing water users in over-allocated water bodies and be subject to reductions in water use based on actual use and reasonable and efficient use guidelines, alongside stepped increase in minimum flow. The maximum consent duration for new water permits granted during stage 1 is to be limited for some over-allocated water bodies by common catchment expiry dates. This will ensure all water permits expire at the same time and be subject to the requirements of stage 2.

286. Stage 2 will occur in water bodies where take limits and/or environmental flows and levels are still not achieved following the implementation of stage 1.

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[52]With is a narrow exception for non-consumptive takes.

[53] LF-FW – Fresh water Chapter of the pORPS.

[54] A take limit cannot be exceeded and the proposed interim take limits allow for consent replacement to be undertaken and reduce the sum of allocation through the consenting process inorder to meet the proposed take limits.

287. Stage 2 sets out 2 pathways for achieving any further reductions in water allocation and/or actual water use required to meet the relevant take limit in the pLWRP by the set time frames:

a. The first pathway is predicated on a collective approach to meet the required reductions. This collective approach could involve the development and the implementation of a plan agreed by all water permit holders within a catchment or from a source water body to reduce the total rate or volume of take to be within the take limit by the time frames set in the pLWRP; or

b. A second pathway is provided where a collective approach is not taken. In this instance a mandatory proportional reduction in the rate or volume of take will be imposed on all water permit holders through the consent replacement process to ensure all water use is within the take limits set in the pLWRP.

288. How stage 1 and stage 2 are implemented will vary depending on circumstances of the catchment where it applies. See case study 3 below for a discussion on the implementation of this proposal. Also see case study 1 above to demonstrate how aspects of this proposal will apply in the Manuherekia Catchment.

Table 29: Case study 3: cost and benefits of implementing consent reviews and common catchment expiry dates

Case study 3: cost and benefits of implementing consent reviews and common catchment expiry dates

The proposed 2-stage approach for managing over-allocation includes the phased implementation of the proposed minimum flows in some catchments through a combination of consent replacement and consent sent review process will likely result in costs and benefits to the environment as well as affected water users and ORC. The table below shows the catchments where consent reviews and/or catchment expiry dates are proposed in the pLWRP, and the number of existing resource consents that are affected by this proposal.

Table 30: Proposed consent review and common catchment expiry dates

River	Consent review date	Catchment expiry date	Number of consents
Arrow River	2030	n/a	10
Cardrona River	2030	n/a	65*
Low Burn	2029	2038	17*
Luggate Creek	2035	2045	4
Park Burn	2035	n/a	1
Benger Burn	n/a	2039	10*
Coal Creek 2	2029	n/a	6
Fraser River	2041	2041	10*
Teviot River	2032	2041	8
Poumāhaka River - Waipahi	2040	2039	3
Manuherekia River	2030	n/a	82
Kākaunui River (including all tributaries except Island Stream and Waiareka)	2029	2039	19*
Island stream	2035	2045	4
Waiareka	2033	2039	24*

Waikōuaiti River	2040	2040	10
**Combined groundwater and surface water takes, for catchments where there is hydrological connection between groundwater and surface water*			

This proposal aims to implement an equitable approach that stages the implementation of changes and uses the consent review process to ensure all water users in the relevant catchments are subject to the same minimum flow restrictions. This also ensure that resource consents holder who require a new consent first are not:

- made subject to more restrictive regime than those who have a greater consent duration, and
- in effect improving the reliability of water supply for later consent holders by ceasing to take water at higher than others in the catchment who can continue to take water.

The common catchment expiry dates ensure an equitable starting point for all consent holders where further action are needed to implement minimum flows and/or reduce allocation. However, due to the wide variety of consent terms that exist in these catchments, are some consents that will expire prior to the proposed 'catchment expiry dates' and which will result in relatively short-term consent being issued for these consents. This is cost for the affect consent holder given that short term consent can impact.

Table 31 below shows the spread of consent expiry dates for existing consents in the Kakaunui/Kakanui river and shows that at least 6 consents will expire within the 5-year period prior to proposed catchment expiry date. This will result in some costs to the affected consent holders in obtaining relatively short-term consents, although such costs can be somewhat mitigated by the implementation and support for consent replacement processes for the affected consent holders by ORC. While such costs are unfortunate for individual consent holders, these costs are considered justified for the net benefit associated with created shared starting point for all consent holder for greater long-term management of allocation in the catchment. Similarly, any replacement of the consents expiring in 2026,27,28 that are subject to default maximum 10-year consent durations are able to apply for an exception that will allow the consent term to extend to 2039 and avoid the need to apply for short-term consents.

*Table 31: Dates that existing resource consents to take water from Kakanui/ Kakaunui catchment expire in relation to proposed consent review date** and catchment expiry date****

Consent duration	2024*	2026	2027	2028	2029**	2030	2032	2035	2036	2037	2039	2044	2045	2047	2050	2051	2052	2053
Total consents	26	2	1	2	2	4	1	4	1	1	1	1	1	1	1	2	2	1
**Consents duration under Water Plan can be no greater than 6 years under policy 10A.2.2, therefore it anticipated that a large tranche of consent expiring in 2024 will be replaced and come up for a replacement in circa 2030.*																		

In contrast, in other catchments there is a greater alignment of existing consents and the catchment expiry date. Table X below shows that in the Teviot catchment there are substantially less consents affected and the dates for the consent review and catchment expiry date largely align so with the existing consents that that there are no consent that expire in the 5 years prior to the catchment expiry date of 2039.

Table 27: Dates that existing resource consents to take water from Teviot River expire in relation to proposed consent review date and catchment expiry date**.*

Year existing consents expire	2027	2032*	2041**
Number of resource consents	1	3	5

Short term consents impact the viability of land uses that rely on water, as they make it default for water user to obtain the necessary finance to invest in infrastructure upgrades needed to reduce the impacts of the proposal such as installing improves irrigation and water storage. For example, Farmer's capital allocation and interest rates are now based on their individual risk and security profile (rather than on the book value of a business). Short term water consents are seen as a risk by banks who also increasingly considers the level of environmental compliance. A high level of scrutiny is put on debt and income risk (and so the farmer) because these risks determine a bank's cost of capital for that client. Banks are now using interest rate margins based on debt and income risk grades (or ratings), along with security and capital (each individual client's capital allocation is a combination of their risk and security profile). While the banks have different approaches, farmers with less viable farm businesses are often unable to access the best interest rates and so can pay more for their borrowing (Moran, McDonald, & Mckay, 2022).

Land uses such as farming, and particularly horticulture and viticulture that rely on water use require large investments to developing or purchasing the land and be operational. For example, a new orchard could cost between $120,000 and $160,000 per hectare. Longer-term consents give producers increased certainty to invest in their land and infrastructure because costs can be spread out over a longer period. Orchards with longer consents usually invest in more technically efficient means of irrigation. Short-term consents create risk aversion. When producers are faced with unknowns this may make them question the viability of producing. For example, if a six-year consent for water is granted, and tree crops take five years to establish before returning a marketable yield, it leaves a single harvest (one year) to factor in return on investment. Longer term consents will increase producer confidence to manage investment risk (Moran (Ed.), 2023).

In the viticulture sector, longer-term consents for the use of fresh water gives producers greater confidence in decision-making around investments. It also encourages long-term planning, and research and development into production methods, including new technologies and innovations around environment actions (e.g., subsurface drip line irrigation). With longer-term consents, the costs of research and development can be spread over a longer period, reducing the investment risk that comes from variability between production seasons. Longer-term consents also allow for external parties, such as lenders and purchasers, to have greater confidence in the producer's performance, which is necessary for the value chain and succession (Moran (Ed.), 2023). Conversely, short-term consents reduce producer confidence and create risk aversion in the sector. Uncertainty can impact investments in land and infrastructure, and all aspects of production down to total yield and quality of produce. It is likely to result in more of a focus on the present rather than planning for the future, impacting on willingness to invest in further development. Lenders, purchasers and others in the value chain are likely to have less confidence in the producer's long-term viability. There is also a risk of trapped assets – land that has been prepared for viticulture but is not yet planted – means it is likely to be more challenging to gain funding for such projects (Moran (Ed.), 2022).

2.7.3. Community and stakeholder feedback

289. A summary of the draft provision based on the 2-stage approach in option 2 were presented during the third round of community engagement. Three was a mixed response received from the community and a wide variety of stakeholders. For some the proposal was considered too onerous and not providing sufficient time for existing water users to adapt and take the necessary action to reduce the impacts of the proposal. For example, design and installing water storage infrastructure. Conversely, for others the proposed staging of minimum flows was considered too delayed and not providing the appropriate level of environmental protection.

290. Many concerns with the impacts of short-term resource consents were raised. Some feedback received was that a 10-year consent was a short-term and that it does not give certainty to farmers with water takes that are investing in long term investments such as irrigation infrastructure.

291. The mixed feedback was considered, however, the 2-stage approach is considered appropriate to strike the right balance by implementing key changes such as higher minimum flows that will benefits water bodies and freshwater ecosystem while also proving sufficient time for existing water users to adapt. Further to this, the proposed time frames are considered appropriate and consistent with achieve the long-term visions in the pORPS[55] for each FMU and rohe. In over over-allocated catchments, short term consents are considered necessary cost in order to effectively and efficiently phase out over-allocation at a catchment scale, and achieve environmental flows, levels and take limits.

2.7.4. Clause 3 consultation feedback

292. Option 2 was presented during clause 3 consultation. Responses from clause 3 parties were mixed particularly by parties representing the primary sector and environmental groups which can be and can be summarised as follows:

a. Many are supportive of the general approach and recognise the importance of phasing out over-allocation.

b. Some parties, particular environmental groups considered that the proposed rules are too permissive, and it should be a prohibited activity to exceed any take limits in all circumstances.

c. Some suggest that over-allocation should be phased out sooner, while others seek longer phase-out timeframes (predominantly parties representing the primary sector).

d. The process for phasing out over-allocation needs to be clearer.

e. Some parties representing water users and the primary sector considered that the overall approach will be divisive for communities where reductions in actual water use are required and that the requirement to phase out over-allocation is unreasonable in light of the changes signalled by the New Zealand government.

[55] LF-FW – Fresh water Chapter of the pORPS.

293. Iwi authorities also provided feedback that the approach for phasing out over-allocation needs to be clearer and expressed concerns with aspects of the proposal such as setting interim take limits as the sum of all consents.

294. In response to the feedback received, amendments were made to the proposed provisions for managing over-allocation. This was largely to make the proposal clearer and more directive. However, the overall general approach was retained as it is considered appropriate to achieve the relevant objectives.

2.7.5. Clause 4A consultation feedback

295. The feedback received by Iwi authorities was that the overall approach to phasing out over-allocation has been made clearer compared to the proposal in clause 3. However, there were concerns still with some aspects of the approach and iwi authorities expressed the view that these do not appear sufficiently robust or workable. In particular:

a. There is no clear signal in the Plan that a reduction in take will be required in the Manuherekia and Taiari catchments to phase out over-allocation. Particularly, given the size of the current allocation in these catchments (which is unrelated to the size of flow in the rivers).

b. Concern with the reliance solely on the minimum flow will not provide for the health of these rivers as take limit are also required to ensure flow variation to support achievement of the environmental outcomes.

c. More certain interim limits are needed to signal the change needed in these catchments, while recognising that additional information is needed to set longer term take limits.

d. Concern that the approach of setting the initial take limit, in many catchments, at the existing maximum consented take does not appear to comply with NPSFM 3.17(4), which requires take limits to be identified that provide for the needs of the water body and aquatic life and that take into account the relevant environmental outcomes.

296. In response to the clause 4A feedback, further amended were made the policy framework for manging over-allocation to make the approach clearer and signal the change required. The amendments included:

a. clearer signal in relevant policies for the Manuherekia and Taiari catchments to signal the that reductions will be required in the future.

b. The addition of methods for determining interim stake limits set at the sum of all resource consents to make the sinking lid aspect of the approach clearer.

2.7.6. Effectiveness and efficiency assessment

297. Section 32(2)(c) of the RMA requires ORC to take into account the risk of acting or not acting if there is uncertain or insufficient information. There is uncertain and insufficient information on the full scale and extent of over-allocation in relation to water quantity in Otago. This information gap includes uncertain and insufficient water metering data, hydrological data and information on the ecological effects of water take and use in all over-allocated water bodies. Additionally, the full scale and extent of the level of change

required to phase out over-allocation and the associated benefits and impacts on the environment and existing water users cannot be fully assessed. However, there is considerable risk in not acting, as the current planning framework will not achieve the relevant objectives.

298. Table 32 below identifies and assesses the environmental, cultural, social, and economic benefits and costs anticipated from implementing the provisions proposed above.

Table 32: Benefits and costs for proposed option for phasing out over-allocation.

	BENEFITS	COSTS
Option 1: Proportional reductions	• Option 1 achieves the required reductions in the total consented allocation of water faster than option 2 as it applies proportional reductions as water permits come up for consent replacement. This has the potential to see more water delivered back to the source water body sooner, which can benefit the health and wellbeing of the water bodies and the ecosystems they support. • Additional water back to the source water body can support high flows and levels and their variability which can benefit cultural and social values by maintaining and enhancing flows for amenity and recreational opportunities, and the habitat needed for healthy populations of mahika kai and taoka species (Timms-Dean, McIntyre, Duncan, & Moran, 2024). • As discussed in the case study 3 above, implementing minimum flows through a combination of consent replacement and consent review processes has individual and community benefits. As this ensure a fairer approach to water restriction as all individual water users in a catchment are subject to the same restriction and reductions. This in turn can support community cohesion and reduce or avoid conflict between competing resource users. • Avoids the risk of unnecessarily penalising those water permit holders that need to apply for a new consent early than those whose existing consents have later expiry dates.	• Option 1 will have costs to individual water permit holders, particularly those that are first to need a consent replacement while others continue to operate under their existing consent. The proportional reductions in the short-term may have inequitable outcomes as it requires the same 'proportionate" reduction by all water permit holders. • The changes required in some catchments and time frames in which they take effect may have social costs including financial stress impacting businesses and communities' cohesion and viability (Reilly K. , 2023). • This option does not distinguish between water permit holders that are already using their existing water according to best practice and those that still have room for improvement. Where best practice already exists there can be fewer options to further reduce use and the investment to achieve best practice may also be act as a constraint. • Pro rata reductions can impose unequal costs on individual water users and in some instances relatively small water users may face relatively large costs to achieve small reductions. • For example, although irrigation is not used extensively on sheep and beef farms, where it is used, it is a vital component of a farm system and is a way of managing the risks that arise from Otago's climatic variability. The costs per hectare of upgrades tend to be more expensive because the scale is fairly limited and more piecemeal. The Pro rata reductions as proposed under option 1 may impose a high cost on such small users that it impacts the viability and resiliency of their farming operation (Moran (Ed.), 2023).

	BENEFITS	COSTS
		• Implementing minimum flows through a consent review process will have financial costs on ORC ratepayers as well as for individual water permit holders. As this process can be expensive and time consuming to undertake for consent holder and the council and is also subject to legal challenge and appeal. • Option 1 has costs for future generations as new water users who may have more beneficial uses for water than existing uses are unable to access it in over-allocated water bodies.
Option 2: 2-stage approach (preferred option)	• A stepped implementation of minimum flows improves environmental outcomes and, in some catchments, can prevent unintended consequences of higher river flow. For example, the phasing in of minimum flows though stepped increases allows time for fish barriers to be established to avoid predation of threatened and indigenous freshwater species by exotic or invasive species. • As with option 1, this option supports delivering water back to the source water body which can support higher flows and levels and their variability which benefit cultural and social values by supporting and enhancing amenity and recreational opportunities, and enhancing the habitat that supports healthy populations of threatened species, taoka species and mahika kai (Timms-Dean, McIntyre, Duncan, & Moran, 2024). • A 2-stage approach provides for a transition period for implementing changes, which benefits individuals and the wider community as it allows water users to plan for, and adapt to, new requirements within specified timeframes. For example, it allows for planning and investment in infrastructure upgrades required to meet new restriction and reduce allocation through water application efficiency improvements. • The option allows ORC to build capacity for the new approach over time. In particular, the Council can improve water	• Option 2 allows for the development and implementation of catchment wide plans and actions to deliver any further reductions required during stage 2. For example, collective infrastructure such as off-stream storage and conveyance, or the design of water sharing agreement. • While this option provides an avenue for community-led solutions, it may have adverse impacts on community cohesion and may cause conflict or tension between competing water users. This is likely to be the case in catchments where actual reductions in water use are required (as opposed to reduction of 'paper' allocation) and where proposed flows and level reduce reliability of water supply.[56] • Implementing Option 2 will require considerable resources for ORC to assist with the development and implementation of community-led solutions, which may impact ratepayers. • A stepped timeframe to implement changes such as minimum flows and reduction in allocation does delay the environmental benefits and improvements to the conditions to waterbodies and freshwater ecosystems as water is returned to the river. This delay also applies to improving cultural and social values that may result from the positive impacts of enhanced amenity and recreational opportunities,

[56] See the summary of the proposal in section 2.6 above, for examples of catchments that may be impacted.

	BENEFITS	COSTS
	quantity accounting, which will support the availability of robust data to inform the level of further reductions that may be required during stage 2 on either a water body or catchment scale.	and habitat that supports healthy populations of mahika kai. • As shown is case study 3, common catchment expiry dates in some catchments will result in short term consent that impact consent holder and their ability to obtain finance for necessary invest in infrastructure improvements. In some instances, financing of infrastructure upgrades will not be viable or obtainable due to perceived risk from banks or the cost of lending.

299. Table 33 below assesses the effectiveness and efficiency of the proposed options in achieving the objectives.

Table 33: Effectiveness and efficiency assessment for options to manage phasing out of over-allocation.

Effectiveness	
Option 1: Proportional reductions	• Option 1 is considered an effective proposal for achieving the objectives relevant to the EFL chapter and addressing the issue of over-allocation. This option is likely to achieve the objectives as it requires: o proportional reductions across all water users and this will reduce the total consented allocation in affects catchments to ensure water use is within take limits. o Implementing increased minimum flows through a stepped time frame and a combination of consent replacement and consent review processes, and this will achieve the proposed environmental flows and level in over-allocated water bodies within the time frames set by the long-term vision in the pORPS.57 • There are some uncertainties and complexities associated with implementing this approach given the variety of existing uses. It can create additional costs for water users that are already applying best practice and are using water efficiently. • The effectiveness of Option 1 will vary depending on the degree to which change, including the need for reductions in actual water use, that is required to meet take limits and environmental flows and levels. For some catchments, significant changes will be required, such as, investment in new water storage and conveyance infrastructure and/or upgrades to existing systems, while for other catchments the level of change required may be minor. • This proposal takes an equitable approach to implementing new minimum flows and levels. The aim is to treat water permit holders within a water body fairly by setting a date at which proposed restrictions such as minimum flows will apply to all water permits holders, either through consent renewal or through a consent review process. This makes this option more likely to be successful, as consent holders will see that it applies fairly across a catchment or water body. • However, the approach of reducing the total allocation by pro rata reductions, is likely

[57] LF-FW – Fresh water Chapter of the pORPS.

	to be less favoured by some water users, as it can place a higher burden on water users that hold a permit that is expiring soon and that need to apply for a consent replacement soon after the plan becomes operative.
Option 2: 2-stage approach (preferred option)	• Option 2 is considered a more effective proposal for achieving the objectives relevant to the EFL chapter and addressing the issue of over-allocation than option 1. • This option is likely to achieve the objectives as it established as 2 -stage approach to implement the changes needed to achieve environmental flows, levels and take limits. • The 2-stage approach will likely be more successful at engaging with affected water users and enabling collective action to phase out over-allocation. For example, Option 2 allows existing water users to adapt and to plan for meeting the new requirements overtime, while still achieving the phasing out of over-allocation within the relevant long-term vision time frames.[58] • As with Option 1, the feasibility of the provisions will vary depending on the degree to which change, including a reduction in actual water use, is required to meet the relevant take limits and environmental flows and levels. • For some catchments significant changes are required, such as investment in new water storage and conveyance infrastructure and/or upgrades to existing systems, while for other catchments the level of change required may be minor. • Option 2 is considered effective as the timeframes for implementing any proposed minimum flows or levels, or consent review processes are tailored to specific water bodies in light of consent durations, and the time required to plan and achieve the long-term visions.[59] • As with Option 1, this proposal takes an equitable approach by setting common dates at which any water take restrictions, such as minimum flows, will apply to all water permits holders.
Efficiency	
Option 1: Proportional reductions	• Option 1 is a less efficient way to achieve the relevant objectives than Option 2. • The stepped minimum flows and levels are considered an efficient way to implement environmental flows and levels by providing for a transitional timeframe that is in line with the timeframes for achieving the long-term visions.[60] However, the potential benefits of reducing the total allocation by mandatory proportional reductions on a case-by-case basis are likely to be outweighed by the disproportional costs of this approach on existing water users.
Option 2: 2-stage approach (preferred option)	• Option 2 is considered the most efficient way to achieve the objectives. • The net benefits to society from implementing this proposal to achieve the relevant objective and manage over-allocation outweigh the potential costs. • The 2-stage approach provides a more equitable and efficient way to reduce total allocation in over-allocated water bodies to achieve the proposed environmental flow and level. For example, this option allows time frames for existing water users to improve their technical efficiency and does not penalise water users that have already adopted best practice. • The 2-stage approach provide management framework that will reduce total allocation in specified time frames. Option 2 will be implemented alongside a suite of provision that will improve the technical and allocative efficiency of water uses within over-allocated water bodies. (For example, allocating water to existing water users

[58] LF-FW – Fresh water Chapter of the pORPS.

[59] LF-FW – Fresh water Chapter of the pORPS

[60] LF-FW – Fresh water Chapter of the pORPS

	during the consent replacement process based on provisions to determine the lesser of actual use or what is reasonable and efficient for the intended uses based on specific criteria.) • Option 2 provides a transition period that allows for improvements in water use and reductions in water loss and wastage to be made. This option also ensures that gains from technical improvements in efficiency of water use are returned the source water body.

2.7.7. Conclusion

300. Option 2 is the preferred option for achieving the relevant objectives and is the most appropriate way to achieve the relevant objectives. The 2-stage approach to phasing out over-allocation is considered the more effective and efficient way of achieving the objectives as it provides a more equitable management framework. As discussed above, Option 2 will likely achieve the relevant environmental outcomes and objectives in the EFL chapter, while having the benefit of providing a greater transition period for existing water users to adapt to the required changes.

2.8. Sub-topic: Managing site-specific river flows (formerly residual flows)

301. The setting of site-specific flow conditions on water permits plays a critical role in managing the effects of water takes from rivers in Otago and ensuring values are provided for below the point of take. Site specific flows are particularly relevant in the context of water takes from tributaries as these often have different flow characteristics from the main stem or are situated in catchments where there is no monitored minimum flow site.

302. Feedback from internal and external stakeholders suggest that the term "residual flow" as it is currently used in the Water Plan is problematic and that the framework in this Plan is inconsistent with higher order planning documents and the principles of Te Mana o te Wai.[61] Given this, the proposal now refers to residual flows as 'site-specific river flows' to provide more emphasis on the health and wellbeing of the river as a first priority. The proposed change in terminology recognises that the setting of site-specific flow requirements as conditions on resource consents is a fundamental part of achieving environmental flows and levels for rivers in Otago.

2.8.1. Discounted options

303. For this topic, the status quo is not considered a reasonably practicable option for the reasons identified above in the 'Overview of the Regional Plan: Water' section above.

2.8.2. Reasonably practicable options

304. Two reasonably practicable options for the setting of site-specific flows for achieving the relevant objectives in the EFL chapter have been identified. These are:

a. **Option 1**: Policy direction to provide for the consideration of site-specific river flows during the resource consent process (preferred option).

[61] For example, "residual" implies left over water for the river, which is considered in consistent with providing for the health and wellbeing of water body as a first priority.

b. **Option 2:** Policy direction for the consideration of site-specific river flows during the resource consent process and prescriptive habitat criteria.

2.8.2.1. Option 1: policy direction to consider using site specific river flows (preferred option)

305. Option 1 proposes to establish a directive policy framework that requires decision-makers to consider the need for site-specific river flows. These can be set through a condition on a water permit, in addition to any other conditions requiring water taking to occur in accordance with relevant environmental flows and levels. The setting of a site-specific flow may be required in the following circumstances:

a. To achieve the relevant environmental flows for the catchment, including any minimum flows or levels at a downstream monitoring site, and provide for the relevant environmental outcomes that apply to and FMU or rohe; and

b. To provide protection for a range of values, including habitat of indigenous threatened species, significant and outstanding values of outstanding water bodies,

c. To provide continued access to water for downstream water users.

306. This option also provides policy direction on the need to ensure compliance with any conditions, including via water metering, instream gauging or the physical design of the intake.

2.8.2.2. Option 2: policy directions and prescriptive habitat criteria

307. Option 2 builds on Option 1 and includes, in addition to the policy direction provided under Option 1, further criteria that must be considered when setting site-specific river flows for the instream habitat needs of identified indigenous freshwater species and sports fish.

2.8.3. Community and stakeholder feedback

308. There was mixed response received during community engagement on the proposal for setting site-specify river flows, which were formerly referred to as residual flows in the Water Plan. There were concerns expressed on what this would mean in practice for both new and existing water takes. For example, how practicable it would be to measure a site-specific river flows. However, there was recognition of the importance of proving for a wider set of freshwater values when setting site-specific flows. There were concerns raised by some with current practice and opposition to the use of 'abstraction' as a tool to manage species interaction. Those in opposition expressed the view that there is insufficient scientific evidence that maintaining very low flows over summer stress periods is effective in limiting predation of trout on non-migratory galaxiids.

309. In response to the feedback received amendments were made to the proposal to make it clearer and more directive on the setting of site-specific river flows.

2.8.4. Clause 3 consultation

310. Draft provisions based on option 1 were presented during clause 3 consultation. The proposal was met with a mixed response, although Clause 3 parties in support of the draft provisions were particularly supportive of the protection provided for threatened indigenous freshwater species.

311. Clause 3 parties in opposition included those representing environmental organisation and the primary production sector and they expressed the following key concerns:

a. The setting of site-specific river flows through the consent process and state that these should be set in the plan.

b. A policy with a non-exhaustive list of matters for consideration may not provide adequate flexibility to address future or overlooked issues.

c. The requirement to install, monitor and operate flow monitoring equipment below the point of take, or to undertake frequent gauging is not practical or possible.

312. Other specific feedback on the draft provisions received during the clause 3 consultation process include:

a. The draft provisions are uncertain and should instead provide clear direction on the levels at which site-specific flows must be set (with limited opportunities exemptions on a case-by-case basis);

b. A list with matters for consideration should be avoided if this does not provide guidance on about how these considerations should be applied in decision-making.

c. Site-specific flows should be set in the context of the minimum flows that apply to the wider catchment to achieve equity by ensuring that the site-specific flows are set relative to the size of the source water body, of the effects of the take, and overall contribution to the minimum flows that apply to the catchment and relevant environmental outcomes,

d. Additional site-specific take limits should be considered to avoid disproportional allocation from a tributary compared to mainstem,

e. The draft provisions may allow for exemptions to the monitoring requirements for takes from tributaries or headwaters due to flow monitoring difficulties in remote locations.

313. There was no detailed feedback received on the draft provision from Iwi authorities. However, there were concerns expressed in relation to the structure and clarity of the EFL provision more generally and how this provision will be implemented through the consent process to achieve the relevant environmental outcomes.

314. The feedback received was considered, however, the proposal was largely retained as drafted as it is considered the most appropriate way to achieve the relevant objectives.

2.8.5. Clause 4A consultation

315. There was no specific feedback on the draft provision during the clause 4A consultation. However, there was general feedback that the clarity of how the environmental outcomes are reflected in the provisions of the LWRP should be improved.

2.8.6. Effectiveness and efficiency assessment

316. Section 32(2)(c) of the RMA requires ORC to take into account the risk of acting or not acting if there is uncertain or insufficient information. There is insufficient information on the different flow characteristics of many of the tributaries across Otago and not all catchments in Otago have a no monitored minimum flow site. However, there is risk in not

acting to establish an appropriate management framework to manage the effects of water takes in rivers, particularly tributaries to ensure environmental flows and levels are achieved.

317. Table 34 below identifies and assesses the environmental, cultural, social, and economic benefits and costs anticipated from implementing the options proposed above.

Table 34: Benefits and costs for proposed options for managing site-specific river flows.

	BENEFITS	COSTS
Option 1: Policy direction (Preferred option)	• Option 1 provides for comprehensive consideration of values in a waterbody's tributaries that may be affected by water takes. Placing greater weight on instream values in decision making will result in improved environmental outcomes. • This option has social and cultural benefits as it ensures associated values are considered when setting site-specific flows. For example, cultural and social values at a different site and reach of a river can be provided for and this can maintain or enhance amenity and recreational opportunities, the habitat that supports healthy populations of mahika kai and taoka species (Timms-Dean, McIntyre, Duncan, & Moran, 2024). • Individuals and communities are likely to benefit socially and economically from the requirement to consider downstream water users. For example, site specific flows can be set on an individual water take to ensure that an existing down-stream water take is not impacted, which could include a community water supply. • Further to the point above, water users within a catchment can work together to maintain a site-specific flows at particular reaches. • The policy direction relating to flow monitoring and gauging will benefit freshwater ecology, specific aquatic species (including threatened species) at different sites and reaches of river and ensure that site specific river-flow conditions are complied with and environmental flows are achieved. This in turn benefits the community and supports the aspirations of achieving sustainable management of water quantity in the region's rivers, particularly tributaries. • By considering the whole system, this option supports a more equitable management framework than the operative Water Plan for all water users within a	• The requirement in Option 1 to undertake a comprehensive assessment of the flow requirements for sustaining values will result in increased costs for water users associated with the consent application process. • A policy with a non-exhaustive list of considerations provides some flexibility but also creates uncertainty for water users, applicants, and decision-makers. Uncertainty can increase process costs. • The requirements relating to flow monitoring and/or the design and construction of intake infrastructure may result in additional costs for water users. • However, the scale and magnitude of such costs will depend on the monitoring approach prescribed (e.g. water metering or instream gauging), and the design of the intake and the local conditions.

	BENEFITS	COSTS
	catchment, including those taking water from tributaries and the main stem. This option also provides more flexibility and can enable water users to work together to meet a shared site-specific river flow or to all be subject to the same conditions. • Benefit to the environment as it the provide a more comprehensive management of water takes in tributaries. This is a important focus given Many of Otago's threatened freshwater fish values are located in the tributaries of many of Otago catchments. As a result, it is important to consider how water takes may affect values in their local environment and set restrictions which better protect them (Ravenscroft P. , 2023b) • It provides a management framework for achieving environmental flows in catchments where no minimum flow monitoring site currently exists and where water demand is limited. • Provides for alternative flow monitoring systems and intake design solutions. This reduces the costs to water users and ORC associated with the installation, maintenance, and operation of minimum flows sites, particularly in catchments where there is limited water use and low water demand.	
Option 2: Policy direction & criteria	• Option 2 sets clear criteria for determining site-specific river flow conditions for specific values. This clarity will have benefits for water users, applicants, and decision makers as it provides a more certain management framework. More certainty can reduce process costs.	• Setting criteria for site-specific river flow conditions will create a more rigid management framework. • This prescriptive approach, which sets specific requirements for infrastructure, imposes undue costs for water users in instances where alternative measures may provide the similar protection for the source water body and the values it supports.

318. Table 35 below assesses the effectiveness and efficiency of the proposed options in achieving the objectives.

Table 35: Effectiveness and efficiency assessment for proposed options for managing site-specific river flows.

Effectiveness	
Option 1: Policy direction (Preferred	• Option 1 is considered effective for achieving the objectives. • The proposal supports the achievement of environmental flows and levels in the pLWRP and it is likely to be successful as it establishes comprehensive management framework for setting site-specific river flows while still retaining some flexibility to

option)	avoid united consequences given that the implementation of site-specific flows occurs on a case-by-case basis. • This proposal is considered to addresses the shortcomings of the framework of the operative Water Plan in relation to residual flows, by allowing the impacts on a wider set of freshwater values to be considered and managed. Therefore, it is directly targeted toward achieving environmental outcomes set for values for FMU and rohe which individual rivers are a part of. • Option 1 provides some flexibility in the setting of conditions that can adapt to the individual needs of a particular river catchment and is less prescriptive than the criteria approach in Option 2.
Option 2: Policy direction & criteria	• Option 2 is effective for achieving the objectives, as it supports the achievement of environmental flows and levels in the pLWRP. • This option applies a prescriptive approach to the setting of site-specific river flows to provide for a comprehensive set of values including the habitat needs of specific indigenous freshwater species and sports fish. • While Option 2 provides some certainty it is a more rigid and may be less practical and more complex to implement in all instances, particularly for existing water takes.
Efficiency	
Option 1: Policy direction (Preferred option)	• Option 1 is considered an efficient proposal for achieving the objectives. • Option 1 provides direction for setting site-specific river flows to support achieving the environmental flows and levels by setting out mandatory considerations. These considerations provide direction, while also allowing some flexibility by allowing for tailored consent conditions or consent conditions that consider the unique aspects of the application or local conditions. This avoids an overly prescriptive regime that may result in costly design and monitoring conditions. • Option 1 is considered a more cost-effective means to achieve environmental flows and levels as it reduces the cost associated with the installation, operation and maintenance of a minimum flow monitoring site in tributaries or small river catchments where the cost of operating a minimum flow monitoring site cannot often easily be justified given the low risk of water taking on the health and wellbeing of the waterbody. In these circumstances option 1 provides an alternative approach to ensuring water takes comply with the environmental flows and levels set for the river catchment.
Option 2: Policy direction & criteria	• Option 2 is considered an efficient proposal for achieving the objectives. However, the more prescriptive nature of this proposal makes this option likely less efficient than option 1 for achieving the objectives. • The mandatory criteria proposed in this approach may in some instances result in over-restrictive requirements such as intake designs and flow monitoring requirements.

2.8.7. Conclusion

319. Options 1 is the preferred option as it is considered the most appropriate way to achieve the relevant environmental outcomes and objectives of the EFL chapter. This option provides the necessary policy direction for setting site-specific river flows conditions on resource consents for water takes in river catchments to support achieving environment flows and levels.

2.9. Sub-topic: Managing the surface water depletion effects of groundwater takes

320. Managing the surface water depletion effects of groundwater takes on surface water bodies is important for maintaining healthy river flows or levels in connected surface water bodies. The assessment of stream depletion effects is typically undertaken as part of a resource consent application process for groundwater takes.

2.9.1. Reasonably practicable options

321. Two reasonably practicable options have been identified for managing the stream depletion effects of groundwater takes to achieve the relevant objectives in the EFL chapter. These are options are:

a. **Option 1:** Current planning framework

b. **Option 2:** Update the provisions in line with current best practice (preferred option).

2.9.1.1. Option 1: Current planning framework

322. Option 1 is to retain the current approach in the Water Plan for assessing the surface water depletion effects of groundwater takes in the pLWRP.

323. Specifically, this option includes retaining:

a. The policy framework in Policy 6.4.1A which sets out that:

i. Schedule 2C which identifies Aquifers managed as surface water because there is a close hydrological connection with the adjoining surface water bodies;

ii. The “100 metre rule” where groundwater takes that are within 100 metres of a connected perennial surface water body are managed as surface water due to the significance of the hydrological connection. These takes are also subject to a minimum flow and surface water allocation availability;

iii. A dual water allocation regime where groundwater takes over 100m away and which depletes surface water by at least 5 litres per second allocate the full quantity of the take against the aquifer take limit and a portion of the take to the surface water take limit a using a specific formula to determine the stream depletion;

iv. All other groundwater takes are allocated as groundwater only;

b. The method in Schedule 5A for managing the hydrological connections between surface water and groundwater and determining stream depletion effects and the degree to which a take is allocated to groundwater and/or surface water.

2.9.1.2. Option 2: Update in line with best practice (preferred option)

324. Option 2 is to update the policy framework and methods from the Water Plan for assessing surface water depletion effects of groundwater takes to better reflect current best practice and resolve known issues with implementing the current planning framework described in section 6.10.3.3.

325. This option proposes to:

a. Update the methodology for assessing surface water depletion effects, as either direct, high, moderate or low and allocates a groundwater take to surface water and/or groundwater according to these categories;[62]

b. Make groundwater takes with direct and high surface depletion effects subject to any relevant minimum flow;

c. Remove the current principle applied by the Water Plan, whereby any groundwater take within 100 metres of a surface water body is considered directly connected and allocated as 100 % surface water and require an assessment.

d. Set a different surface water depletion threshold at which the surface water depletion rate of the groundwater takes is classified as low or are exempt from the assessment based on water body size, rather than a single threshold of 5 litres per second for all surface water bodies.[63]

e. Remove the double counting component of the dual allocation regime where a stream depletion portion of a groundwater take is also allocated to the aquifer take limit. groundwater allocation (as is currently occurring under the operative Water Plan).

2.9.2. Community and stakeholder engagement

326. A theme identified throughout the community engagement on the pLWRP was that the connection between Otago's surface water and groundwater resources should be recognised and managed appropriately. The proposal for managing surface water deletion has been developed to achieve. There was limited specific feedback received on the proposal during community engagement. However, there was feedback that the pLWRP should set a clear method for determining stream depletion that is consistent with best practices in other regions.

2.9.3. Clause 3 consultation

327. Draft provisions based on option 2 were presented during clause 3 consultation. There was limited feedback received on the proposed provisions or technical aspects of the proposal. Some parties opposed the proposed depletion thresholds in the absence of science or technical supporting material during the consultation period.

328. Following the feedback received and further technical analysis, amendments were made to the proposed provisions in order to provide a clearer and more directive framework for assessing the surface water depletion effects of groundwater takes.

[62] The assessment will calculate the proportion of water that comes from surface water after pumping for a set duration, and the equation set out in schedule 5A will not be retained. See APP21 – Determining the surface water depletion effect of a groundwater take of the pLWRP.

2.9.4. Clause 4A consultation

329. There was no specific feedback received by Iwi authorities on the proposed provisions or technical aspect of the proposal, so no change were made following clause 4A consultation.

2.9.5. Effectiveness and efficiency assessment

330. Section 32(2)(c) of the RMA requires ORC to take into account the risk of acting or not acting if there is uncertain or insufficient information. Assessing the hydrological relation between surface water and ground water is complex and subject to uncertainties. There is currently insufficient information available on the full scale and extent of impacts that may result from a change in the approach to managing surface water depletion effects. However, not acting does pose a risk to groundwater and surface water bodies in Otago as the individual and cumulative effects are not currently robustly or accurately assessed.

331. Table 35 below identifies and assesses the environmental, cultural, social, and economic benefits and costs anticipated from implementing the proposed options.

Table 28: Benefits and costs for proposed options for managing stream depletion effects.

	BENEFITS	COSTS
Option 1: Current approach	• Retaining the current planning framework for managing stream depletion will avoids the implementation costs of a new regulatory framework and the uncertainty this may create. For example, the 100-metre rule creates a simpler assessment regime. • Provides some environmental benefits as ground water takes from alluvial aquifers or with direct depletion effects on surface water bodies are considered as surface water and allocated as so, and effects are managed through relevant minimum flows.	• There are known issues with implementation and water accounting that are not resolved and doing so will incur costs to ORC and resource users. • Aspects of the current framework contribute to inaccurate water quantity accounting and inefficient allocation of resources. For example, the 100 metre rules is arbitrary, and the dual allocation regime described above, may result in inaccurate results in double counting of allocation in some instance which does not reflect actual water use or allocation. • The 100-metre rule does not allow consideration of the impacts on the groundwater resource. This can be particularly problematic for large takes located close to the boundary (e.g. 80-90m away from the river/lake), where a portion of the take is likely to be from groundwater storage but is not accounted for in the groundwater allocation (Levy, Yeo, & and Ettema, 2024a). • Surface water depletion assessment may, not provide adequate protection of smaller surface water bodies. This may affect values associated with higher and variable flows and level which contribute to social and cultural values including amenity and recreational opportunities, and the habitat of mahika kai and taoka

	BENEFITS	COSTS
		species.
Option 2: Adopt best practice (Preferred option)	• Option 2 will improve the management of groundwater and surface water interactions by implementing a clearer and more robust management regime that is in line with best practice in other regions. • Economic benefits include a more accurate water quantity accounting and allocation of ground water resources. For example, this option does not retain the dual allocation and double counting of groundwater and surface as occurs in option 1. In some instances, this may enable additional allocation of groundwater and in other instances this will offer greater protection of groundwater and surface bodies. • This option avoids some of the potential risks associated with the current planning framework by providing greater protection of smaller surface water bodies, from the cumulative effects of water takes. • Greater protection of small rivers can support higher flows and levels and variability which can benefit cultural and social values by maintain and enhancing amenity and recreational opportunities, and the habitat that supports healthy populations of mahika kai and taoka species (Timms-Dean, McIntyre, Duncan, & Moran, 2024).	• Option 2 will incur higher costs and information requirements on applicants to determine surface water depletion effects. For example, reduced stream depletion cut-off rates based on surface water body size may require small takes to undertake an assessment. Such assessments are currently not required for small takes under the status quo. • There will be cost for ORC staff, landholders and private practitioners associated with education and adjusting to new requirements. • Applying a new method for calculating stream depletion effects may alter the allocation status or amount of available allocation of surface water. • An assessment under the proposed method in Option 2 may result in a different proportion of allocation to surface water or ground water than under the current Water Plan methodology for calculating stream depletion effects. • For example, an existing take within 100 m of surface water body may not have a 100 % stream depletion effect under the method proposed under option2, as would be assumed under the 100 m principle currently embedded in the operative Water Plan.

332. Table 36 below assesses the effectiveness and efficiency of the proposed provisions in achieving the objectives.

Table 29: Effectiveness and efficiency assessment for proposed options for managing stream depletion effects.

Effectiveness	
Option 1: Current approach	• Option 1 is not considered an effective proposal for managing surface water depletion and achieving the objectives relevant to the EFL chapter. • Given the known issues of the current framework, it is considered that there is greater risk that the current assessment criteria and allocation framework groundwater take that are connected to surface water bodies will not contribute positive to achieving the objectives relevant to the EFL chapter.
Option 2: Adopt best practice (Preferred option)	• Option 2 is considered an effective proposal for managing surface water depletion in way that that is likely to achieve the objectives relevant to the EFL chapter. • Option 2 proposes to manage stream depletion effects of groundwater takes under a more robust and accurate assessment and allocation framework. This approach is directly targeted to managing the surface water depletion effects of groundwater and

	achieving environmental flows, levels and take limits, set for groundwater, and surface water bodies in the pLWRP. • While adopting a new approach often poses implementation challenges, option 2 is considered a more fit for purpose planning framework for managing the hydrological connection between surface water and ground water.
Efficiency	
Option 1: Current approach	• The implementation costs of Option 1 are anticipated to be relatively low, given that this option proposes to maintain the current planning framework for managing stream depletion effects. However, given the known risks and net costs associated with the current planning framework discussed above, this option is not considered an efficient proposal for achieving the relevant objectives.
Option 2: Adopt best practice (Preferred option)	• Option 2 is considered an efficient proposal for achieving the relevant objectives. • The benefits of option 2 outweigh the anticipated costs associated with transition to a different approach for managing stream depletion effects. • The proposal will support a more robust and accurate stream depletion assessment method and allocation framework and provides for better managing the hydrological connection between surface water and groundwater and the effect of groundwater takes on surface water resources.

2.9.6. Conclusion

333. Option 2 is the preferred option as it is considered the most appropriate way to achieve the objectives relevant to the EFL chapter. The proposal establishes a more fit for purpose planning framework for managing the stream depletion effects of ground water takes.

2.10. Sub-topic: Efficiency of water use

334. Policy 11 of the NPSFM requires that freshwater is allocated and used efficiently, all existing over-allocation is phased out, and future over-allocation is avoided. The NPSFM also requires the pLWRP to include criteria for deciding how to improve and maximise the efficient allocation of water (which includes economic, technical, and dynamic efficiency). The pLWRP must also include methods in its regional plan to encourage the efficient use of water.[64]

335. The proposal does not set specific take limits for different types of water uses based on any determined allocative efficiency objectives. This was not considered a reasonably practicable option and was discounted (see section 7.9.5). Take limits are set in accordance with the NOF process, and any water available within these limits is allocated to water users on a first-in first-served principle. The rationale for the proposal to retain the first-in first served principle to available allocation includes that:

    a. The setting of environmental flows, level and take limits under the NOF process has given effect to Te Mana o te Wai and the hierarchy of obligation so that the first priority has already been considered and that the second priority is also provided for in other ways (including permitted rules and the management of restrictions).

[64] Clause 3.28 NPSFM

b. Most water bodies with competing demands are already fully allocated or over-allocated and require bespoke approaches where actual reduction will be required to phase out over-allocation.

c. Where water is available the proposal does not 'pick winners' and it is considered more economically efficient and effective to set take limits that allow for people and the community to determine the water demand and use to support the ability of people and communities to provide for their social, economic, and cultural wellbeing, now and in the future. For example, setting allocative block may result in water being locked away where there is no demand for a particular use.

d. As discussed above in section 7.9.5 setting allocative take limits for third priority uses is impractical at a regionwide scale to implement. For example, often a water permit is for a mix of purposes.

336. This section evaluates the proposal ensuring water allocation is shown to be reasonable and efficient for the needs of the intended use. This largely focuses on the technical efficiency of an individual water permit, which is key for managing water allocation and long-term efficiency as it ensures that no more water is take than what is needed.

2.10.1. Discounted options

337. For this topic, the status quo is not considered a reasonably practicable option for the reasons identified above in the 'Overview of the Regional Plan: Water' section above.

2.10.2. Reasonably practicable options

338. Two reasonably practicable options to achieve the relevant objectives were identified:

a. **Option 1:** Policy framework to ensure that the amount of water taken and used is reasonable and efficient for the intended use.

b. **Option 2:** Policy framework to ensure take and use of water is reasonable and efficient for the intended use and additional specific efficiency guidelines for common water uses (preferred option).

2.10.2.1. Option 1: Policy framework to ensure take and use of water is reasonable and efficient for the intended use

339. Option 1 proposes a directive policy framework to ensure that the quantity of water taken and used from a water body is reasonable and efficient for the intended use.

340. The policy will include direction to maximise the efficient use and conveyance of water by setting the following efficiency standards:

a. water used for irrigation meets an application efficiency of no less than 80%;[65] and

b. new water conveyance systems have losses of no greater than 10% of the rate of take.

[65]This application efficiency is constant with Industry best practice being 80% for all irrigation systems, based on the Irrigation NZ Piped Irrigation Systems Design Standards (2013)

341. As discussed in the sub-topic on managing over-allocation, the provisions relating to water efficiency play a critical part in avoiding future over-allocation and phasing out existing over-allocation. Under this option any 'technical efficiency gains' made by a water user in an over-allocated water body that result in a reduction in total allocation are to be returned to the source water body.

342. In contrast, any technical efficiency gains in a water body that is not over-allocated or fully allocated that result in additional allocation being available, can be retained by a water permit holder, provided it is for an additional use and meets the efficiency policy and any other relevant provision to manage the effects of the additional use. If the allocation is not required or cannot meet these requirements the allocation will be returned to the take limit and available to a new applicant.

2.10.2.2. Option 2: Policy framework and specific guidelines for common water uses (preferred option)

343. Option 2 proposes to set guidelines in the LWRP for determining the reasonable and efficient water needs of common activities, in addition to the policy framework proposed in Option 1. The common activities include animal drinking water, domestic supply, irrigation,[66] frost fighting, dairy shed supply, other drinking water suppliers.[67] The guidelines proposed are consistent with current consenting practice and based on industry best practice.[68]

344. Under this option, any person proposing to take water for a use that is not managed by the guidelines will be required to provide information as part of the application to take and use this water demonstrating that the proposed rate or volume of take is reasonable and efficient for the intended water use. The information provided may include the industry best practice.

345. Option 2 takes the same approach as Option 1 in relation to how technical efficiency gains are to be managed in fully or over-allocated water bodies and where water made available from these gains can be re-allocated.

[66] Reasonable and efficient rates and volume of water for irrigation are to be determined in accordance with the *Guidelines for Reasonable Irrigation Water Requirements in the Otago Region 2017*.

[67] including, but not limited to, motel and hotel accommodation, schools, camping grounds, hospitals, restaurants and bars.

[68] See APP18 – Reasonable and efficient water use and conveyance of the pLWRP.

Table 30: Case study 4 - Regionwide profile of irrigation type and water demand

Case study 4: Regionwide profile of irrigation type and water demand

The costs and benefits of implementing directive policy on the efficient water use is difficult to quantify for individuals or across the region, as Figure 7 shows a wide distribution of different irrigation infrastructure in Otago.

The most common irrigation types by area are pivot (35%) and K-line/long lateral type (22%), followed by borderdyke (9%) and wild flooding (7%). Other irrigation types include gun, roto rainer, drip/micro, lateral, solid set, linear boom (10% all together) and unknown (17%). More than half of the irrigated land on pastoral and arable farms is K-line, pivot, or roto rainers. Horticulture (incl. nurseries and orchards) tends to rely on drip/micro irrigation (78%).

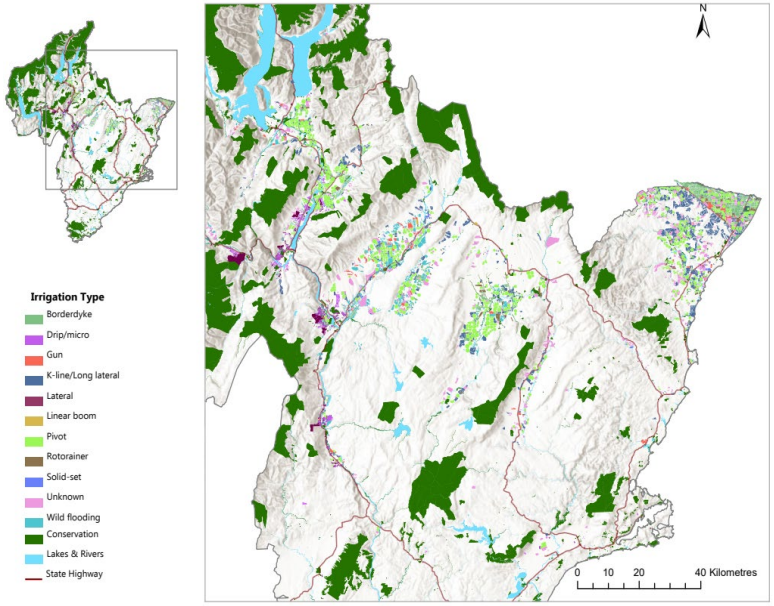

Figure 6: Irrigation in Otago by irrigation type in 2021 (Aqualinc, 2021)

Further to this, table 38 below shows that the estimated water uses and demand varies by land use. (Yang & Cardwell, 2023)For example:

- Dry stock farming has the lowest ratio of irrigated land to total land (3% for sheep and beef and 9% for deer farming). This is followed by dairy land use (25%), arable farming (31%), and horticulture (36%).
- Horticulture has the highest average water demand per hectare of irrigated land, with 4,500m3/ha/annum. This is followed by 3,700m3/ha/annum for deer farming, while sheep and beef farming and dairy farming both use around 2,800m3/ha/annum.

Table 38 shows that each agricultural industry uses irrigation in different ways. A small proportion of total farm area sheep and beef farms and deer farms is irrigated on while it much more on dairy farms, arable farms, and horticulture. Horticulture uses more water per ha than pastoral farming. Irrigation water is not all of the water used in these industries. Other uses include stock drinking water or water used for shed washdown. Water use can also include discharges of contaminants (e.g., nutrients, and sediment). The value gained from irrigation water use, measured by various metrics (e.g., employment, value-added, export revenue and number of people fed), is also not reflected.

Table 31: Estimated water demand by land use

Land use type	Total irrigated land (ha)	Total land use (ha)	Share of land irrigated	Water demand (m^3)	Average water demand per ha of irrigated land (m^3/ha)	Average water demand per ha of total land (m^3/ha)
Arable	2,566	8,178	31%	n/a*	n/a	n/a
Dry stock (incl. beef, sheep and mixed livestock)	63,562	1,895,701	3.4%	183,558,641	2,888	97
Deer (incl. mixed deer with livestock and specialised deer)	1,840	19,646	9.4%	6,785,241	3,687	345
Dairy (incl. dairy support)	40,233	163,597	25%	110,763,533	2,753	677
Horticulture (incl. nurseries & orchards)	4,033	11,091	36%	18,136,266	4,497	1,635

2.10.3. Community and stakeholder feedback

346. A summary of draft provision based on option 2 was present to the community and stakeholder at the third round of community engagement. While there was general support for the approach in terms of ensuring that water use if efficient, there were concerns expressed on what this will mean in practice and how the proposal will impact existing water users. For example, there were concern on how the policy direction will impact different water uses given that what is reasonable and efficient will vary widely depending on land use type and the scale of activities. There were also concerns expressed that the proposal will be "punitive" and claw back water by not factoring in change in water use due to changes in demand on a seasonal basis. For example, low water uses for irrigation during in wet summers.

347. It is considered that the proposal does provide the necessary direction for determining the reasonable and efficient water needs for different purposes, and that it provides sufficient flexibility to be applied on a case-by-case basis during the consent application process. Further to this, the policy framework recognises seasonal variability in demand exists, and the determination of reasonable and effect water use, and actual water use is not designed to act punitively. It is recognised that such an approach often has unintended consequences as it can encourage 'use it or lose it' behaviour.

2.10.4. Clause 3 consultation

348. Draft provision based on option 2 were presented during clause 3 consultation. The following feedback was received:

a. That efficiency should be considered at a wider scale, as it was viewed that the focus was predominantly on technical efficiency.

b. There may be unintended consequences of efficiency provisions.

c. Concern that there will be insufficient water for dry years if efficiency gains result in reduced allocation for a water user.

349. There was no specific feedback received on the draft provisions from iwi authorities.

350. The feedback received was considered some amendments were made to clarify the intent of provisions relating to efficiency, including to direction and the standards that apply to water use and water conveyance in terms of water loss.

2.10.5. Clause 4A consultation feedback

351. There was no specific feedback received from iwi authorities on the draft provisions and no changes were made. Although it was noted that without reference to strategic objectives, that the single objective on efficiency of water use makes the focus of EFL appear to be on water use rather than on the health and wellbeing of the water bodies and ecosystems.

2.10.6. Effectiveness and efficiency assessment

352. Section 32(2)(c) of the RMA requires ORC to take into account the risk of acting or not acting if there is uncertain or insufficient information. There is uncertain information on the full scale and extent of impacts of the proposed option. However, given that the proposal are intended to give effect to higher order planning instruments there is risk of not acting as this will not achieve the relevant objectives.

353. Table 39 below identifies and assesses the environmental, cultural, social, and economic benefits and costs anticipated from implementing the options proposed above.

Table 32: Benefits and costs for proposed options for efficiency of water.

	BENEFITS	COSTS
Option 1: Policy framework	• Contributes to phasing out over-allocation. For example, technical efficiency gains can contribute to reducing the total allocation from a water body and pave the way for returning water to an overallocated source water body. • Benefits the environment by ensuring that no more water is taken from waterbodies than what is reasonably needed and efficient for the intended use and by supporting the avoidance of future over-allocation and phasing out of existing over-allocation. • More water returned to or remaining in a source water body minimises the modification of the flows and levels and their variability. Such flows and levels support the maintenance and enhancement of social and cultural values associated with water bodies including amenity and recreation opportunities, and the habitat of support mahika kai and taoka species	• Requires existing users that do not meet the efficiency standards for irrigation application and water conveyance to undertake system upgrades. This will result in costs for individuals and communities where (further) investment is required to meet these efficiency requirements. This may include cost associated with upgrading existing systems and infrastructure. • For some existing uses that are reliant on older technology and small in scale meeting the requirements may impact the viability of existing land uses. For example, improving water use efficiency, through major upgrades to irrigation systems is not necessarily a sound investment for many sheep and beef farms if the returns are insufficient to cover the costs. This also means obtaining finance is unlikely from lenders (Moran (Ed.), 2023).

	(Timms-Dean, McIntyre, Duncan, & Moran, 2024). • Benefits individuals and communities by improving and maximising the efficiency of water use and supporting economic development. • In water bodies that are not over-allocated or fully allocated technical efficiency will contribute to economic growth by maximising the amount of allocation that is available for future water use by existing water permit holders or new water users. • Promotes economic development by avoiding the ongoing allocation of unutilised water (i.e. 'water banking'[69] by existing water users). • Benefits existing and potential water users, by setting clear direction on what is required to meet the thresholds set by policy and/or what level of improvement in technical efficiency of water use may be required. • The proposal provides for flexibility by recognising that reasonable and efficient use will depend on the proposed type of use and the scale of the activity. For example, option 1 allows for a variety of irrigation application methods to occur (provided they meet the standards set in the policy). • This option supports a variety of different land uses that rely on water use and irrigation at different scales as it provides for tailored assessment depending on the activity (see case study 4 above).	• However, the costs on individuals will depend on the scale and extent of their land and water use, and their existing infrastructure. As shown above in case study 4, there is a variety of irrigation types used in Otago for different land uses and water uses and demand varies and is difficult to quantify.

[69] Water banking is the practice of forgoing water deliveries during certain periods, and "banking" either the right to use the forgone water in the future or saving it for someone else to use in exchange for a fee or delivery in kind.

Option 2: Policy framework & specific guidelines (Preferred option)	• Option 2 provide the same policy approach as option 1. and has the same benefits as option 1. • Additional benefits for applicants and decision makers include clear guidance for determining the reasonable and efficient water use for common types of uses. • For example, water used for frost fighting on shoulder seasons can be considerable in the horticulture and viticulture, and this option provides direction on what is reasonable and efficient for types of water use. • Embeds existing consenting practice for determining a reasonable and efficient water use into the LWRP's planning framework.	• Option 2 provides the same policy approach as option 1. and has the same costs as option 1.

354. Table 40 below assesses the effectiveness and efficiency of the proposed options in achieving the objectives.

Table 33: Effectiveness and efficiency assessment for options for efficiency of water use.

Effectiveness	
Option 1: Policy framework	• Option 1 is considered an effective proposal for achieving the objectives relevant to the EFL chapter. • The proposed policy framework and efficiency standards are likely to achieve the objectives relevant to the EFL chapter, particularly EFL-O1. For example, the proposal ensures that any water that is taken is shown to be reasonable and efficient for its intended use by setting appropriate efficiency standard. • Additionally, the proposal provides criteria to improve and maximise the efficiency of water use and supports the avoidance of future over-allocation and the phasing out of existing over-allocation. This is likely to contribute to achieving environmental flow, levels and take limits for water bodies in Otago.
Option 2: Policy framework & specific guidelines (Preferred option)	• Option 2 is considered an effective proposal for achieving the objectives relevant to the EFL chapter. Like option 1, option 2 ensures that water that is taken is shown to be reasonable and efficient for its intended use which is likely to achieve EFL-O1. • Option 2 is considered more effective than option 1, as it provides clear guidelines to determine what constitutes reasonable and efficient water use for a range of common activities. This creates a more certain planning framework for water users and decision makers to implement and will likely be successful at achieving the objectives relevant to the EFL chapter
Efficiency	
Option 1: Policy framework	• Option 1 is considered an efficient proposal for achieving the objectives relevant to the EFL chapter. • This option is considered to provide net benefits to society as the proposed policy framework and efficiency standards seek to improve and maximise the efficiency of water use and support the avoidance of future over-allocation and phasing out of existing over-allocation.

	• This option retains some flexibility for water users, by ensuring that scale and extent of activities can be considered in decision making relating to the allocation of water. For example, the policy allows for different irrigation types to be considered efficient, depending on the scale and extent of a proposed activity (provided the efficiency standards can be met).
Option 2: Policy framework & specific guidelines (Preferred option)	• Option 2 is considered an efficient proposal for achieving the objectives relevant to the EFL chapter. This option has additional benefit to option 1 as this proposal provides additional guideline to determine what amounts to reasonable and efficient water use for common activities. This creates a more certain planning framework that will assist the application process for water users and decision makers.

2.10.7. Conclusion

355. Option 2 is the preferred option as it is the most appropriate way for achieving the objectives relevant to the EFL chapter. This proposal provides a clear and consistent planning framework for plan users that will ensure that the amount of water taken from water bodies is shown to be reasonable and efficient for its intended use.

2.11. Sub-topic: Water quantity accounting of water takes and associated discharges

356. There are various instances in Otago where freshwater is being stored and transported across a complex supply and conveyance network that includes instream and off-stream dams, natural water bodies and artificial water courses (e.g. open canals and raceways), artificial lakes and piped infrastructure. As discussed in description of the regional planning framework, accurate measuring and accounting for water use and conveyance is considered necessary to phase out existing over-allocation in Otago (Auspurger, Olsen, & and Dyer, 2024).[70] Therefore a policy framework is needed to effectively manage and account for the conveyance of water within natural waterbodies in Otago and the associated taking, use, damming, diversion and any associated discharges of water for the purposes of water conveyance.

357. Further to this, the NPSFM requires ORC to maintain a freshwater quantity accounting system to assess and facilitate the achievement of environmental flows, levels and take limits. Additionally, a fit for purpose water accounting system will facilitate effective and effect water quantity management including consent application processes and allocation decision-making and reduces their complexity.

358. The is section evaluates options for freshwater quantity accounting of water takes, use and associated discharges (damming and diversion are discussed in section 7.12).

[70] This is also necessary to resolving the misallocation of stored water and primary allocation in catchments with large onstream dam such as the Manuherekia River and Taiari River.

2.11.1. Discounted options

359. For this topic, the status quo is not considered a reasonably practicable option for the reasons identified above in the 'Overview of the Regional Plan: Water' section above. In particular, the current planning framework is not fit for purpose to give effect to the requirement to undertake freshwater accounting in higher order planning instruments or to effectively manage complex water quantity issues in Otago.

2.11.2. Reasonably practicable options

360. Two reasonably practicable options to achieve the objectives relevant to the EFL chapter were identified:

a. **Option 1:** Require the metering of all water takes and associated discharges.

b. **Option 2:** Provide exceptions and alternative solutions to metering (preferred option).

2.11.2.1. Option 1: Require the metering of all water takes and associated discharges

361. Option 1 requires proposes to account for and measure all aspects of water taking and conveyance within natural water bodies in Otago by requiring all permitted and consented takes to be metered.[71]

362. This option will improve water quantity monitoring by providing data on the complex network of instream water conveyance and water takes across Otago and requires the metering of any:

a. Discharges of water to a water body for the purpose of supplying a "secondary take"[72] or for maintaining environmental flows or levels;

b. Secondary take; [73] and

c. Discharges to a water body from renewable electricity generation activities.

2.11.2.2. Option 2: Provide exceptions and alternative solutions to metering (preferred option)

363. Option 2 requires the metering of some aspects of water taking and conveyance within natural water bodies and provides exceptions that enable alternative way to measure or demonstrate that limits are not exceeded. This option makes exceptions for the following:

a. For consented takes below 5 l/s these must demonstrate how they will not exceed any relevant limits;

[71] In this evaluation 'metering' is referring to the instantaneous recording such as the telemetered metering requirements under the metering regulations, whereas 'measuring' may include other alternative means such as modelling, longer term record.

[72] A "secondary take" means the taking of water that has been discharged into a water body for the purpose of supplying that take. For example, water stored in a dam and is released from the dam into a stream to supply a downstream intake.

[73] Where there is a single point of take, the proposal is to require a separate meter for any secondary take from that used for any "run of river" take unless water user can demonstrate how each take is identified within the metering record.

b. For permitted activity takes requirements to supply specific information to ORC prior to a take commencing, including the location of the take and the proposed rate and volume of take.

c. Exceptions for alternative ways to demonstrate how limits will not be exceeded. For example, where appoint of take is used for run-of-river takes and secondary takes allowing a resource user to demonstrate through a single metering record rather than install a separate water metering device.

2.11.3. Community and stakeholder feedback

364. A key theme from the community and stakeholder engagement in the development of the pLWRP was that it is critical that over-allocation in relation to water quantity is phased out and that this is informed by robust information. The proposal for water accounting of all aspect of water takes and associated discharges has been developed to inform more effective and efficient water quantity management in Otago. This includes understanding the complex network of existing water use in many catchments in Otago to inform the action needed to address misallocation and over-allocation.

365. The feedback received during community engagement included concerns on what the proposal would mean in practice, for example how practicable it would be to meter all aspect of wate use and associated discharges given the reliance on existing infrastructure. In response to this feedback the proposal has been developed to include alternative method to telemetered metering to provide for practicable solution for existing infrastructure.

2.11.4. Clause 3 consultation

366. Draft provisions based on option 2 were presented during clause 3 consultation. The response to draft provisions under option 2 was mixed, with some supporting the proposed provisions and other opposing it.

367. A summary of specific feedback on the provisions included:

a. the provisions should provide guidance on when measuring is not required and be clear that this is a rare exception,

b. Other types of discharge, such as discharges of heated cooling water from a renewable thermal electricity generation planta should also be subject to a measuring requirement,

c. Concern by parties representing water users and the primary production sector about the practicality of retrofitting existing infrastructure (such as in stream dams) with appropriate measuring or metering devices.

d. There was no specific feedback received from iwi authorities on the draft provisions for water accounting.

368. The feedback on the proposal was considered, however, the proposal was largely retained as drafted as it is considered the most appropriate way to achieve the relevant objectives.

2.11.5. Clause 4A consultation feedback

369. There was no specific feedback received on the draft provisions for water accounting during clause 4A consultation, so no changes were made.

2.11.6. Effectiveness and efficiency assessment

370. Section 32(2)(c) of the RMA requires ORC to take into account the risk of acting or not acting if there is uncertain or insufficient information. The current water metering and accounting framework produces uncertain and insufficient information to understand the full scale and extent of water use and conveyance in Otago. There is considerable risk in not acting as the current water accounting framework is not fit for purpose to achieve the relevant objectives.

371. Table 41 below identifies and assesses the environmental, cultural, social, and economic benefits and costs anticipated from implementing the options proposed above.

Table 34: Benefits and costs of options for water metering and accounting.

	BENEFITS	COSTS

Option 1:
all water takes and associated discharges
	• Improves water quantity management and freshwater accounting, which will support ORC's performance in terms of carrying out its role and function on behalf of community.
	• Improves data and freshwater accounting of all aspects of water use, which contributes:
	  ○ to a greater understanding of the extent of water use in the region, particularly in complex over-allocated water bodies and support future plan developments and decision making in relation to allocation of water quantity,
	  ○ Steps in phasing out over-allocation and achieving pORPS[74] long term visions and the community and mana whenua aspirations for freshwater.
	• More robust water quantity accounting provides more certainty for water users, for example, this will assist with ensuring water conveyed in natural water bodies is taken downstream by the intended receiver and not intercepted by others.
	• Environmental benefits as this option will assist in ensuring compliance with environmental flows and take limits and managing cumulative effects of water
		• Option 1 will result in costs for individual water users resulting for the need to meet the metering requirements. Costs will include those associated to purchase, install, maintain telemetered metering devices as well as cost associated with verification and data management.
		• Installation of adequate metering devices may be a particular challenge for existing infrastructure.
		• The number of takes that will be required to install or upgrade water metering devices under the approach taken by option 2 is unknown. The estimated costs associated with the installation and operation telemetered metering devices by MfE in 2021 were:
		  ○ $600 to $1,500 for the purchase and installation of the unit,
		  ○ $20 to $30 per month for subscriptions to manage the data over the cellular network,
		  ○ Approximately $3,000 per unit where satellite is the only option for the daily transfer of data, with a $100 monthly service fee.
		• Implementing a more comprehensive

[74] LF-FW – Fresh water Chapter of the pORPS.

	BENEFITS	COSTS
	takes across region.	water quantity accounting system will generate additional costs for ORC associated with the data management and verification.

Option 2: Provide exceptions (Preferred option)	• Option 2 has the similar benefits as option 1 but has additional benefits for individual water users as it provides:
	  ○ a cost-effective way for water users to demonstrate that any taking, use or discharges are not exceeding any applicable limits.
	  ○ some flexibility for water users in terms of using a practicable intake design that provides adequate information to account for all water use.
	• Enables water users to measure water use through existing infrastructure, where appropriate and thereby reduces the costs associated with prescriptive methods, such as requiring telemetered metering.
	• A more comprehensive management of all aspects of water use for consented takes (including small ones) can assist individual water users. For example, the proposal will assist with system maintenance as more accurate metering will aid fault identification such as leaks.
	• Avoids costs of installing metering device in all circumstances for water users.
		• Option 2 will have lower costs for some water users who meet the proposed exceptions such as taking water under the permitted activity rules as they can demonstrate that they are meeting relevant limits and will not incur costs associated with installing and maintaining metering.
		• There will be cost on ORC to manage additional data and to provide the user-friendly means for water users to provides information and alternative ways of measuring water take to the council. However, this is considering a lower cost than option 1.

372. Table 42 below assesses the effectiveness and efficiency of the proposed options in achieving the objectives.

Table 35: Effectiveness and efficiency assessment for proposed option for water metering and accounting

Effectiveness	
Option 1 (All water takes and associated discharges)	• Option 1 is effective for achieving the objectives relevant to the EFL chapter. • The proposal seeks to improve water quantity accounting of Otago's complex network of instream water conveyance. This proposal is targeted to achieve the objectives relevant to the EFL chapter and to ensure compliance with environmental flows, levels and take limits set for water bodies in Otago. • The proposal will likely be successful as it will improve decision making in relation to allocation of water quantity as there will be a greater understanding of the extent of water use in the region, particularly in complex over-allocated water bodies.
Option 2 (Exception for permitted activity takes)	• Option 2 is considered an effective proposal for achieving the objectives relevant to the EFL chapter. • As with option 1, the proposal seeks to achieve these objectives by improving water accounting and freshwater management, including by better enabling compliance monitoring. to ensuring compliance with environmental flows, levels and take limits.

	• As with option 1, it is considered that this proposal will successfully implement an improved water quantity accounting regime.
Efficiency	
Option 1 (All water takes and associated discharges)	• Option 1 is not considered an efficient proposal for achieving the objectives relevant to the EFL chapter. While this option does have benefits, on balance there are net costs that are cannot be reasonably justified in light of the viability of more cost-effective alternatives. • Option 1 requires metering of all water takes including those authorised by permitted activity rules. This option will be challenging to implement and will result in costs for water users that are currently not required to have a water meter under the existing water metering regulations. This option is less feasible to implement than option 2. The high costs associated with installing and maintaining metering devices cannot be reasonably justified in all circumstances when alternative solutions are available. • While a more effective water quantity accounting system (than currently exists) may place a financial burden on some water users, it is considered acceptable to the community and stake holders as his proposal enables ORC to manage water quantity more effectively. For example, better understanding of the full extent and scale of water taking across Otago, allows for future over-allocation to be avoided more effectively and enables ORC to better manage the effects of any new activities on existing water users.
Option 2 (Exception for permitted activity takes)	• Option 2 is considered the more efficient proposal for achieving the objectives relevant to the EFL chapter. • While Option 2 does results in costs for some water users, these are outweighed by the net benefits to society by improving water quantity accounting and management in Otago. • Option 2 provides for more cost-effective alternatives for small, permitted water takes to demonstrate actual water use. • Option 2 avoids imposing costs associated with the installation and operation of water metering devices on all water takers by providing for those operating under the permitted activity rules with alternative methods to demonstrate any water that is taken is within relevant limits. • While there are some challenges and costs associated with implementing the proposal, this option can be reasonably justified as it supports a more effective water quantity accounting system than option 1. For example, installing appropriate devices or applying appropriate methods to measure water take, use and discharges will support avoiding future over-allocation and the phasing out existing over-allocation.

2.11.7. Conclusion

373. Option 2 is the preferred option as it considered to be the most appropriate way to achieve the objectives relevant to the EFL chapter. Option 2 will improve water quantity accounting and management by requiring the measuring of all aspects of water use and conveyance within natural water bodies. This option allows for practicable solution to meet the requirement, depending on the scale of water takes.

2.12. Sub-topic: Water conveyance

374. There are many instances in Otago where freshwater is being transported across a complex network of artificial water courses, piped infrastructure and natural water bodies (instream conveyance). For example, water stored at the Loganburn Dam on Loganburn Creek, a tributary of the Taieri River in the Paerau Valley at the southern end of the Maniototo Plain, is released from the dam into the Loganburn creek to supply more reliable

downstream extraction for irrigation during time of demand and to maintain environmental flows (Ward & Russell, 2010)..

375. Some types of water conveyance systems, for example those relying on the conveyance of water via natural water bodies and open races, can be subject to higher levels of water loss (e.g. through evaporation or filtration through the bed of the watercourse) than systems that rely on piped infrastructure (Johnson, 2023). For example, Barkhordari and Shahdany (2022) found that when estimating losses in irrigation canals that of the total losses modelled, seepage losses were 10%, with 90% being operational (by-wash). This means that often more water needs to be taken out of the river than what is needed for the intended use of that water. Because of risks associated with water loss as well interception of overland flows or river flows, water conveyance via natural water bodies or open channel races, poses particular challenges with respect to freshwater accounting and meeting the NPSFM requirements in terms of freshwater accounting will often require much higher levels of investment in water metering infrastructure from both ORC and the water user(s).

376. The conveyance of water via natural water bodies can result in benefits and costs to the environment, as instream water conveyance can change the instream habitat of freshwater species, through changes in flow velocity, temperature, risk of spread of invasive species. For example, the discharge of relatively cool water into a river to supply a downstream point of take may support aquatic life during low flow periods by providing additional flow. Conversely, the release of relatively warmer water may have adverse effects on aquatic life. Further to this, instream conveyance can alter the natural form and character of rivers and their riparian environment and modify the natural flow regime. This can have impacts on freshwater values, with the risk increasing with greater flow modifications resulting from instream conveyance (Richter et al., 2012).

2.12.1. Discounted options

377. For this topic, the status quo is not considered a reasonably practicable option for the reasons identified above in the 'Overview of the Regional Plan: Water' section above. For example, the current planning framework for managing water conveyance does not give effect to higher order planning instruments, in particular policy 11 of the NPSFM which requires that "*Freshwater is allocated and used efficiently, all existing over-allocation is phased out, and future over-allocation is avoided*."

2.12.2. Reasonably practicable options

378. Two reasonably practicable options for managing water conveyance in order to achieve the objectives relevant to the EFL chapter were identified:

a. **Option 1**: avoid any new instream water conveyance and phase out any existing practices overtime.

b. **Option 2:** avoid any new instream water conveyance and provide for existing networks.

c. **Option 3:** provide for new instream conveyance where this supports the achievement of the environmental outcomes (preferred option).

2.12.2.1. Option 1: avoid any new instream water conveyance of water in natural waterbodies and phase out existing practices overtime

379. Option 1 proposes to prohibit any new conveyance of water in a natural water body, previously taken and to phase out any existing practices whereby water is taken and subsequently conveyed within natural water bodies.

380. This option proposes to impose mandatory conditions on any resource consent for an existing activity to phase out all existing conveyance of water within a natural water body and convert to an out of stream conveyance system within the relevant time frames set in the long-term visions included in the pORPS.[75]

381. Option 1 also proposes to include policy direction in the LWRP to avoid the use of a natural water body to convey water previously taken unless the sole purpose is to benefit the health (including cultural health) and wellbeing of freshwater bodies and associated ecosystems.

2.12.2.2. Option 2: avoid any new instream water conveyance and provide for existing networks (preferred option)

382. Option 2 provides for existing practices that use natural water bodies to supply water as a discretionary activity This option provides policy direction in the LWRP to manage the effects of various aspects of these existing water conveyance networks, including the discharge of water and the "secondary taking" of water.[76]

2.12.2.3. Option 3: provide for new instream conveyance where this supports the achievement of the environmental outcomes (preferred option).

383. This option provides for new instream water conveyance where this supports the achievement of environmental outcomes.

384. This proposal includes policy direction setting out the circumstance where any new use of rivers to archivally convey way is allowed, namely where it supports:

a. achievement of the environmental outcomes,

b. target attribute states,

c. interim target attribute states, and

d. alternative criteria for the river or FMU or rohe that the river is part of.

2.12.3. Community and stakeholder feedback

385. A summary of draft provisions based on option 2 were presented to the community and stake holder during the third round of community engagement as part of the development of the pLWRP. There was considerable feedback received on matters that relate to water conveyance, including concerns on what the proposal would mean in practice but also

[75] LF-FW – Fresh water Chapter of the pORPS.

[76] "Secondary take" means the taking of water that has been discharged into a water body for the purpose of supplying that take.

recognition of the importance of providing for water conveyance and off stream storage in the pLWRP. Water conveyance and off stream storage were seen as critical to water users to reduce the impacts on water availability and supply from proposed minimum flows and climate change.

386. The proposal was developed to support water conveyance and off stream water storage.

2.12.4. Clause 3 consultation feedback

387. Draft provisions based on option 2 were presented during clause 3 consultation. Some clause 3 parties opposed the proposal as drafted, suggesting that the proposal would have a significant impact on existing water users and that an exemption should be made for community water supplies.

388. There was limited specific feedback on the draft provision relating to water conveyance from iwi authorities. Some of the general feedback on the clarity of the approach was considered to apply to these provisions given how connected many topics are in the EFL chapter.

389. The feedback was considered; however, the proposal was largely retained as drafted as it is considered the most appropriate way to achieve the relevant objectives. There were some amendments made to drafting make the policy direction clearer.

2.12.5. Clause 4A consultation feedback

390. There was specific feedback received on the draft provision relating to water conveyance to make aspects of these provision clearer and consistent with other parts of the EFL chapter. Amendments were made to the draft provisions largely as suggested.

2.12.6. Effectiveness and efficiency assessment

391. Section 32(2)(c) of the RMA requires ORC to take into account the risk of acting or not acting if there is uncertain or insufficient information. There is insufficient and uncertain information available to determine full scale and extent of the costs and benefits associated with improving water conveyance systems across all of Otago. However, there is risk to water bodies and the resiliency of water supply networks in the future by not establishing a more fit for purpose planning framework now.

392. Table 43 below identifies and assesses the environmental, cultural, social, and economic benefits and costs anticipated from implementing the proposed options for manging water conveyance. As discussed above the current planning framework for managing water conveyance is not a reasonably practicable option and the assessment of options below is in relation to the requirements of higher order planning document[77] (not the current planning framework in the Water Plan).

Table 36: Benefits and costs for proposed options to manage water conveyance.

	BENEFITS	COSTS

[77] In particular, policy 11 of the NPSFM

	BENEFITS	COSTS
Option 1: Phase out All instream conveyance	• Benefits to environmental flows and levels as modified flow as a result of instream conveyance will be phased out over time. • Phasing out all instream water conveyance supports flow regimes that 'reflect' natural conditions, this in turn benefits social and cultural values associated with water bodies, including maintaining and enhancing flows that support amenity and recreational opportunities and habitat for mahika kai and taoka species. • Benefits to native aquatic species and threatened species as this option reduces the risk of water conveyance resulting in spread of invasive species or habitat alteration through changes to the biophysical habitat or water quality parameters. • The phasing out component of this option is likely to benefits existing water users as it provides a transition period to allows infrastructure upgrades to existing networks over time to the convert to out of stream conveyance. • Providing for a transition period will reduce costs of implementing upgrades and avoids the costs prohibiting the use of existing infrastructure in the interim.	• Eliminates the potential for ecological benefits from existing and new in stream water conveyance to occur. For example, instream water conveyance can in some instances can maintain environmental flows and reduce the impact of low flow events by providing additional flow. For example, in the Taiairi catchment, water released from the Loganburn dam to supply more downstream extraction for irrigation does help to maintain environmental flows. • Phasing out of all existing instream conveyance will result in costs associated with designing, installing and maintaining out of stream infrastructure such as pipes (Irrigation NZ, 2013).
Option 2: Avoid new	• Providing for existing practices has: o social and economic benefits as existing instream conveyance networks support land uses reliant on this network that provide for economic benefits to communities. o Some ecological benefits where existing networks support the maintenance of environmental flows, and this in turn can support wider values such as providing water to maintain habitat for threatened species and taoka species. o Supports more accurate water quantity accounting as it is easier to measure water takes in off stream infrastructure. This in turn can support achieving environmental flows and levels. For example, improvements to existing water conveyance structure and understanding of losses can supporting actions to phasing out existing over-allocation. • Improving water conveyance infrastructure	• Option 2 will result in costs for water users that rely on existing water conveyance systems. However, these costs are likely to be lower than those associated with option 1 as existing system are provided for as this proposal does not impose the complete phase out as proposed in option 1. • Limited potential for ecological benefits resulting from new in stream water conveyance to assist with the maintenance of environmental flows.

	BENEFITS	COSTS
	has social and economic benefits as its support the resiliency of the water conveyance network to the effects of climate changes. For example, out of stream infrastructure such a piped supply network will reduce water loss which will be important if water supply is reduced.	
Option 3: Provide for new (preferred option)	• Benefits to the environment as this option support achieving or maintaining environmental flows and levels. • Social and economic benefits as its support the resiliency of the water conveyance network as new instream conveyance may minimise effects of climate changes on instream values. • Potential social, cultural, and economic benefits as providing for new instream conveyance can support: • Achieving environmental outcomes, for example, flushing flows from stream conveyance can support water quality outcomes.	• New instream conveyance creates more complex water quantity management and accounting. • Higher costs associated for applicant to demonstrate a proposal will support achieving environmental outcomes and other requirements of option 3. • Potentially high risk to instream values from instream conveyance modifying the natural flow regime.

393. Table 42 below assesses the effectiveness and efficiency of the proposed provisions in achieving the objectives.

Table 37: Effectiveness and efficiency assessment for proposed options to manage water conveyance.

Effectiveness	
Option 1: Phase out existing instream conveyance	• Option 1 is considered an effective proposal for addressing issues in relation to water conveyance in Otago and contributing to the achievement of environmental flows and levels. It is likely to be successful at achieving this as avoids any new use of natural water bodies as part of water conveyance network and reducing the risk of any further hydrological modification of Otago water bodies.
Option 2: Avoid new	• Option 2 is considered effective for achieving the objectives relevant to the EFL chapter. This option provides for existing instream conveyance and is likely to be more successful at achieving the relevant objectives than option 1 as it is likely more acceptable to the wider community and stakeholders as it provides for a more pragmatic approach by allowing for a transition period and practicable solutions.
Option 3: Provide for new (preferred option)	• Option 3 is considered effective for achieving the objectives relevant to the EFL chapter. This option is likely to successful at achieving the relevant objectives as it allows new instream conveyance where it can be demonstrated that this will support achievement of the relevant objectives. • This option does this by including policy direction that sets out the circumstances where any new use of rivers to archivally convey way is allowed
Efficiency	
Option 1: Phase out	• Option 1 is not considered an efficient proposal for managing water conveyance to achieving the objectives relevant to the EFL chapter.

All instream conveyance	• This proposal will result in costs in all circumstances and does not provide for the recognition of some of the environmental benefits that may result from existing conveyance of water in natural water bodies.
Option 2: Avoid new	• Option 2 is considered an efficient proposal for managing water conveyance to achieving the objectives relevant to the EFL chapter. • The proposal provides a transition period for phased improvements to be made. Further to this, the proposal recognises that the costs of a complete phase out of all existing in stream water conveyance for the community may not be justifiable where there are no practical solutions or alternatives water sources available.
Option 3: Provide for new (preferred option)	• Option 3 is considered an efficient proposal for managing water conveyance to achieving the objectives relevant to the EFL chapter. • The benefits of option 3 outweigh the potential costs, as this option allows for new instream water conveyance to occur while ensuring the potential effects and risks to instream values are manged to achieve the relevant objectives.

2.12.7. Conclusion

394. Option 3 is the preferred option as it is considered the most appropriate way to achieve the objectives relevant to the EFL chapter. Option 3 manages water conveyances in a manner that is effective and efficient in terms of achieving the objectives relevant to the EFL chapter. The anticipated benefits of Option 3 will outweigh the potential costs associated with implementing the proposal.

2.13. Sub-topic: Cross mixing of water

395. There are instances in Otago where the use of natural water bodies as part of the conveyance network involves the cross mixing of water that has no natural connection. Examples of cross-mixing of water include:

a. the water taken from tributaries of the Clutha-Matau being discharged into tributaries of the Taiari catchment as part of the Waipouri Hydro electricity schemes;

b. water taken from tributaries of the Taiari catchment being discharged into the tributaries of the Manuherekia catchment to supply Manor burn and Pool burn reservoirs.

396. This cross mixing of water from different catchments has significant cultural impacts on Kai Tahu values, including on the distinctive mauri of these water bodies. [78] The LWRP must recognise and respond to Kāi Tahu cultural and spiritual concerns about this practice.[79] The cross mixing of water can also poses risks to spread of invasive species or habitat alteration through species interactions that would not occur otherwise.

[78] The proposal defines "Cross mixing" to mean the *discharge* of water from one *water body* into another *water body*, where there is no natural connection between those *water bodies*. For example, water is taken from a tributary of the Clutha Mata-au into a water race and then discharged into a tributary of the Taiari river for a secondarty take at a downstream intake.

[79] pORPS, LF–FW–M6(9).

2.13.1. Discounted options

397. For this topic, the status quo is not considered a reasonably practicable option for the reasons identified above in the 'Overview of the Regional Plan: Water' section above.

398. The current planning framework does not give effect to higher order planning instruments. In particular, the NPSFM's requirement which seeks to protect the mauri of water bodies,[80] and it does it sufficiently recognise and respond to Kāi Tahu cultural and spiritual concerns about mixing of water between different catchments.[81] Therefore, carrying over the framework for managing the cross-mixing of water in the Water Plan into the pLWRP is a discounted option.

2.13.2. Reasonably practicable options

399. Three reasonably practicable options for managing the cross-mixing of water in order to achieve the objectives relevant to the EFL chapter were identified:

a. **Option 1**: avoid any new cross mixing of water and phase out all existing cross mixing overtime.

b. **Option 2**: avoid any new cross mixing of water and phase out existing cross mixing[82] to the extent practicable.

c. **Option 3:** Effects based policy direction (preferred option).

2.13.2.1. Option 1: Avoid any new cross mixing of water waterbodies and phase out all existing cross mixing over time

400. Option 1 proposes to prohibit any new cross mixing of water and to phase out any existing practices.

401. This option proposes to impose mandatory conditions on any resource consent for an existing activity to phase out all existing cross mixing within the relevant time frames set in the long-term visions included in the pORPS[83].

402. Option 1 also proposes to include policy direction in the LWRP to avoid any new activities that will result in the cross mixing of waters, including the use of a natural water body to convey water previously taken.

2.13.2.2. Option 2: avoid any new cross mixing and phase out existing cross mixing to the extent practicable

403. As with Option 1, this option proposes to prohibit any new cross mixing of water. For existing cross-mixing practices this option seeks to phase out this practice to the extent practicable.

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[80] NPSFM, Clause 1.3(1)

[81] PORPS, LF-FW-M6(9)

[82] "Cross mixing" means the *discharge* of water from one *water body* into another *water body*, where there is no natural connection between those *water bodies*. For example, water is taken from a tributary of the Clutha Mata-au into a water race and then discharged into a tributary of the Taiari river for a secondary take at a downstream intake.

[83] LF-FW – Fresh water Chapter of the pORPS.

404. This option proposes to impose mandatory conditions on any resource consent replacement for an existing activity to phase out all existing cross mixing within the relevant vision time frames set in the long-term visions included in the pORPS.[84]

405. Option 2 provides for existing water conveyance networks that use natural water bodies to supply water as a discretionary activity that involves the cross mixing of waters, while requiring the phasing out of cross mixing to extent practicable taking into consideration any freshwater or freshwater ecosystem values currently supported by the mixing.

406. Option 2 recognises that there in some instances important freshwater ecosystem values or community services are dependent on existing practices of cross-mixing of water. For example, some community drinking water supplies and renewable electricity generation schemes currently rely on water supply networks that involve cross mixing.

2.13.2.3. Option 3: Effects based policy direction (preferred option)

407. This option proposes to provide policy direction that focuses on the effects of cross-mixing, rather than an stringent avoid or phase out approach as proposed by option 1 and 2.

408. This option provides direction that:

a. avoids new activities that will result in the cross mixing of waters, including any use of a river to artificially convey water, unless the purpose is to benefit the health (including cultural health) and wellbeing of freshwater bodies and freshwater ecosystems,

b. allows some flexibility for existing cross mixing,

c. sets guidance on matters to take into account if cross missing is occurring or proposed,

d. direction for applicants to consult with Kāi Tahu before they apply for consent.

2.13.3. Community and stakeholder feedback

409. A summary of the draft provisions for managing cross-mixing based on option 2 were presented during the third round on community and stake holder engagement. There was limited specific feedback received on the proposal.

2.13.4. Clause 3 consultation feedback

410. Draft provisions based on option 2 were presented during clause 3 consultation. Some clause 3 parties opposed the proposal as drafted, suggesting that the proposal would have a significant impact on existing water users and that an exemption should be made for community water supplies.

411. There was no specific feedback on the draft provisions for managing cross-mixing of water from Iwi authorities. However, it was stated the direction on cross-mixing was lacking in the polices and rules regarding transfers. Although the reference to the transfer occurring within the same take limits implies that the intention is to enable the transfer of takes on

[84] LF-FW – Fresh water Chapter of the pORPS.

the same water body. Amendments were sought to make the direction on cross-mixing explicit in the transfers policy and rules.

412. The feedback was considered; however, the proposal was largely retained as drafted as it is considered the most appropriate way to achieve the relevant objectives. There were some amendments made to the draft provisions to provide greater clarity on aspect of the policy direction for Cross-mixing and transfers in response to the feedback received.

2.13.5. Clause 4A consultation feedback

413. Clause 4A feedback was that approach proposed in the EFL chapter is more "black-and-white" than necessary, particularly with respect to phasing out existing cross-mixing and there was a request to delete and replace the draft provision with a policy approach that:

a. identifies Kāi Tahu as an affected party for any application that will result in cross mixing, and

b. requires that the potential effects on both the source water body and the receiving water body be taken into consideration in decision-making.

414. After further discussion with iwi, Option 3 was developed to provide more flexibility and guidance on cross mixing including:

a. a shift the focus towards the nature of the effects of concern,

b. direction to it make clearer that there is some flexibility for existing cross mixing,

c. guidance on matters to take into account if cross missing is occurring or proposed,

d. direction for applicants to consult with Kāi Tahu before they apply for consent.

2.13.6. Effectiveness and efficiency assessment

415. Section 32(2)(c) of the RMA requires ORC to take into account the risk of acting or not acting if there is uncertain or insufficient information. There is insufficient information available to determine full scale and extent of the costs and benefits associated with phasing out existing cross mixing across Otago. However, the is risk to Kāi Tahu cultural and spiritual values in not acting as the current planning framework does not give effect to higher order documents.

416. Table 45 below identifies and assesses the environmental, cultural, social, and economic benefits and costs anticipated from implementing the proposed options. As discussed above the current planning framework for managing the cross mixing of water is not a reasonably practicable option and the assessment of options below are in relation to the requirements of higher order planning document (not the current planning framework in the Water Plan).

Table 38: Benefits and costs for proposed options to manage water conveyance and cross mixing.

	BENEFITS	COSTS
Option 1: Phase out all cross-mixing	• Recognises and responds to Kāi Tahu cultural and spiritual concerns about mixing of water between different catchments. • Benefits existing water users and communities as provides for a transition	• Phasing out all existing cross mixing of water is anticipated to impose cost on water users that rely on existing water conveyance systems that include the cross-mixing of water.

	BENEFITS	COSTS
	period to phase out existing cross mixing. • Reduces the risk of changes to the biophysical habitat or water quality parameters. • Reduces invasive species interaction with threatened species occurring through the cross-mixing of water.	• Costs associated with system upgrades to avoid cross mixing, will vary depending on the scale and extent of upgrade required to design, install and maintain out of stream conveyance systems or whether alternative water sources are available. • In water bodies that are over-allocated this may incur greater costs as alternative water source will not be readily available or suitable. This will be the case where instances cross mixing occurs in the Taiari and Manuherekia catchments given the existing over-allocation of surface water and practicable issues or limitation of sourcing water from alternative sources such as groundwater.
Option 2: Phase out to extent practicable	• As with Option 1, Option 2 recognises and responds to Kāi Tahu cultural and spiritual concerns about mixing of water between different catchments. • Greater benefits than option 1 for existing water users and communities dependent on existing cross mixing of water. In addition to a transition period, this option provides for reducing the incidence of cross mixing to the extent practicable and where cost-effective alternatives are available. • Avoids risk of further changes to the biophysical habitat or water quality parameters. • Avoids any further invasive species interaction with threatened species occurring through new cross-mixing of water. • Benefits for communities reliant on water conveyance systems where cross-mixing occurs by recognising the importance of existing infrastructure and allowing for practicable solutions (i.e. alternative sources) and not requiring a total phase out in all circumstances. • Recognises that existing conveyance infrastructure may support important community values or ecological values (such as providing for threatened species habitat).	• Option 2 will likely result in less costs than option as it only require a phasing out of existing cross-mixing to the extent that this practicable. • For affected water users this will require an assessment of whether there are practicable alternative means available to replace the cross-mixing, but it will not necessarily mean that the practice must stop entirely. • The scale and extent of potential costs are therefore uncertain and difficult to quantify and will depend what practicable alternative available which will assessed on a case-by-case assessment. • For example, in some instances cost-effective alternatives such as out of stream conveyance may be practicable whereas in other instance it may not be.
Option 3: Effects based approach	• Option 3 has the same benefits as option 1 and 2, and more as it: o provides more flexibility for existing cross mixing,	• In some instances, this option may result in further cross-mixing which may have a greater impact on mana whenua values than option 1 or 2.

	BENEFITS	COSTS
(Preferred option)	○ provides direction for applicants to consult with Kāi Tahu before they apply for consent, which can enable an assessment of impact on mana whenua values at an early stage of the process.	• Potentially higher costs, (including opportunity costs) for mana whenua associated with engagement process (compared to option 1 and 2) (Timms-Dean, McIntyre, Duncan, & Moran, 2024).

417. Table 46 below assesses the effectiveness and efficiency of the proposed provisions in achieving the objectives.

Table 39: Effectiveness and efficiency assessment for proposed options to manage water conveyance and cross mixing.

Effectiveness	
Option 1: Phase out all instream conveyance	• Option 1 is not the most effective proposal for managing the cross mixing of water to achieve the objectives relevant to the EFL chapter. • Option 1 is effective in terms of contributing to the achievement of environmental flows and levels and recognising and responding to Kāi Tahu cultural and spiritual concerns about mixing of water between different catchments. • The proposal to avoid any new and phase out all existing cross mixing of water is considered challenging to implement and is unlikely to be as successful as option 2 given that it is unlikely to be considered acceptable by the wider community and certain stakeholders. This particularly the case where existing conveyance systems that involve cross mixing provide significant community benefits and where there are no other practicable or cost-effective alternatives available.
Option 2: Avoid new	• Option 2 is considered an effective proposal for achieving the objectives relevant to the EFL chapter. • This option will likely be successful at addressing issues relating to the cross-mixing of waters as it: ○ provides for the phasing in of improvements and upgrades to existing water conveyance infrastructure that involve the cross mixing of water. ○ recognises the importance of some existing water conveyance infrastructure that involve cross mixing of water for sustaining important community and ecological values. • This option takes a 'softer' approach to phasing out existing cross mixing, by only requiring this to the extent practicable. this enables the phasing in of practicable and cost-effective solutions in instances where a 'hard' phase out is not practicable solution.
Option 3: Provide for new (preferred option)	• Option 3 is considered an effective proposal for achieving the objectives relevant to the EFL chapter. • This option will likely be successful as it recognises that the appropriate way to address this issue will vary from situation to situation and that central requirement in every case is that mana whenua are involved in determining the approach to be taken.
Efficiency	
Option 1: Phase out All instream conveyance	• Option 1 is not considered an efficient proposal for managing the cross mixing of water to achieve the objectives relevant to the EFL chapter. • The anticipated net costs of avoiding and phasing out all cross mixing in all instances will likely outweigh the potential benefits of this option.

Option 2: Avoid new	• Option 2 is considered more efficient than option 1 for managing the cross mixing of water to achieve the objectives relevant to the EFL chapter as on balance it delivers a net benefit. • The proposal responds to Kāi Tahu cultural and spiritual concerns about mixing of water between different catchments while also providing a transition period for phased improvements to be made. Further to this, the proposal recognises that the costs of a complete phase out of all existing cross mixing for the community may not be justifiable where there are no practical solutions or alternatives water sources available. • The proposal provides for a more pragmatic approach to the phasing out of existing cross mixing, while still achieving the objectives which is considered to provide a net benefit to all of society.
Option 3: Provide for new (preferred option)	• Option 3 is considered the most efficient proposal for managing the cross mixing of water to achieve the objectives relevant to the EFL chapter as on balance it delivers a net benefit. This option: o enables mana whenua are to be involved in determining the approach to be taken in manging cross-mixing. o Provides flexibility for existing cross-mixing while ensuring the effects of this activity are appropriately managed.

2.13.7. Conclusion

418. Option 3 is the preferred option as it manages the cross mixing of water in a manner that is effective and efficient in terms of achieving the objectives relevant to the EFL chapter. The anticipated benefits of Option 2 will outweigh the potential costs associated with implementing the proposal.

2.14. Sub-topic: Transfers of water permits

419. The RMA provides for two types of transfer of water permits under certain conditions:

a. Transfers of a consent holder's interest in the permit to another person (e.g. following the sale and purchase of a property)[85]

b. Transfers of the point of take from one site to another provided it is in the same catchment.[86]

420. The transfer of a water permit or consent holder's interest in the permit to another person is an administrative procedure that does not need to be manage under the LWRP.

2.14.1. Discounted options

421. For this topic, the status quo is not considered a reasonably practicable option for the reasons identified above in the 'Overview of the Regional Plan: Water' section above.

422. The framework in the Water Plan does not give effect to higher order planning instruments and does not have a fit for purpose framework for managing the environmental effects that may arise from the transfer of the point of take from one site to another. Therefore,

[85] Section 136(2)(a), RMA

[86] Section 136(2)(b), RMA

carrying over the existing framework in the Water Plan into the LWRP is a discounted option.

2.14.2. Reasonably practicable options

423. Two reasonably practicable options were identified to manage the transfer of the point of take from one site to another to achieve the objectives relevant to the EFL chapter:

a. **Option 1:** Directive policy framework with multiple rule pathways

b. **Option 2:** Directive policy and rule framework (preferred option).

2.14.2.1. Option 1: Directive policy framework with multiple consenting pathways

424. Option 1 proposes to include directive policies and rules in the LWRP for managing the temporary or permanent transfer of the point of take, in whole or in part, from one site to another.

425. The policy proposed under this option will provide clear direction on:

a. what type of effects are to be managed when considering applications for transfers

b. the limits and restrictions that apply in respect of transfers including:

i. the transfer of the point of take from one site to another site must be from same water body or within the same catchment and must involve water allocated from the same associated take limit;

ii. the transfer cannot involve unused “paper” water;

iii. the transferred water must be used for the same purpose and meet the provision for efficient use;

iv. in over-allocated catchments or waterbodies at least 20% of the transferred allocation must be surrendered; and

426. This option also includes rules to manage the transfer of water permits, whereby the activity status depends on the risks associated with the transfer and the allocation status of the water body The proposal will include a:

a. controlled activity rule pathway for transfers considered low risk will be subject to a less stringent considerations. For example, an entry condition is that the water body is not fully or over-allocated.

b. restricted discretionary activity for transfers that are of higher risk will be a with matters of discretion that seek to manage the risks associated with the proposed transfer. This will include transfer in fully or over-allocated waterbodies.

c. non-complying activity pathway where any transfer cannot meet the entry conditions of the restricted discretionary rule.

2.14.2.2. Option 2: Same directive policy framework as option 1 with more limited consenting pathways (preferred option)

427. Option 2 proposes the same directive policy framework, but without the proposed 20 % mandatory reduction in allocation in over-allocated water bodies.

428. This option has a single entry restricted discretionary rule for all transfers. As with option 1, where the entry conditions of the restricted discretionary activity rule cannot be met the transfer can be applied for as a non-complying activity.

2.14.3. Community and stakeholder feedback

429. Concern on water being "lost" from a community through transfers were express during community engagement on the draft provision and how these will be geographically limited to avoid this in the pLWRP. The proposal provides clear direction on these areas of concern as transfers of water permits can only occur within the same surface water body or aquifer, and within the same take limit. Further to this, the pLWRP contains maps of allocation zones which show where a take limit applies within surface water bodies and aquifer. This provides a planning framework with clear geographical limit on where the transfer of water permits can occur.

2.14.4. Clause 3 consultation

430. Draft provisions based on option 2 but with the 20% mandatory surrender clause for transfers in over-allocated water bodies proposed in option 1 were presented during clause 3 consultation. The feedback received from Clause 3 parties included:

a. Opposition to the requirement to surrender 20% of the consented allocated when applying for transfers of the point of take from one site to another in over-allocated catchments.

b. General support for the proposed approach, with requests to make further amendments to:

i. Ensure that the installation of fish screens and provision of fish passage are included in the rule framework as a relevant matter of discretion;

ii. Make it explicit that transfers are not provided for where cross-mixing of water is occurring;[87] and

iii. Ensure that any adverse effects of a transfer are managed by the effects management hierarchy set out in Clause 3.21 of the NPSFM.

431. Feedback from iwi authorises was that the proposal omits reference to the policy direction on cross-mixing and that this should be explicitly stated.

432. Following the feedback received amendments were made to the proposal for managing water permit transfers clearer and more directive. The requirement to surrender 20 percent of allocation upon a transfer in over-allocated water bodies was removed as it was considered to be unnecessary as the general efficiency policies require a reduction and the proposal as drafted may result in perverse effects.

2.14.5. Clause 4A consultation feedback

433. Iwi authorities sought amendment to draft policy and rules framework for site-to-site transfers to:

[87] This feedback was from Iwi authorities.

a. ensure the transfer is limited to the same river environment (i.e. the part of the water body where the flow is essentially the same as for the consent being transferred), and, in particular, that it cannot be transferred to a point upstream where the flow is less.

b. Include reference to the draft Appendix 8 in the draft plan in relation to Mana whenua indicators for land and fresh water specifically to the effects on ecosystems and habitats.

434. In response to this feedback amendments were made to the policy and rule framework to ensure potential adverse effects of transfers are considered and that matters of discretion provide direction on transfers.

2.14.6. Effectiveness and efficiency assessment

435. Section 32(2)(c) of the RMA requires ORC to take into account the risk of acting or not acting if there is uncertain or insufficient information. There is insufficient information available to assess the potential demand for transfers of the point of take from one site to another in the future. There are risks in not acting and having a robust planning framework to manage these types of transfers, particularly in situations where water demand has increased but the quantity of water that is available for taking becomes more restricted in the future.

436. Table 47 below identifies and assesses the environmental, cultural, social, and economic benefits and costs anticipated from implementing the proposed options.

Table 40: Benefits and costs for options to manage transfers of water permits.

	BENEFITS	COSTS

Option 1:
Policy framework & multiple pathways
	• Reduces costs and complexity of transfer processes for individuals and decision makers as it provides a clear and directive planning framework.
	• Supports improving and maximising the efficiency of water use.
	• Benefits the health of freshwater bodies and ecosystems by provides strong direction for management the effects that may occur as a result of site-to-site transfers.
	• Supports the phasing out of over-allocation by:
	  ○ requiring 20% reductions in allocation in over-allocated water bodies;
	  ○ avoiding the ability to “bank” water by only allow the transfer of water that has been used.
	  ○ Further to the point above, direction on what can be allocated upon transfer, can potential to see more water delivered back to the source water body, which can benefit the health and wellbeing of the water
		• The restrictions on the transferability of water permits, including the requirement to surrender 20% allocation in over-allocated water bodies and the inability to transfer any unused allocation (i.e. “paper water”) is likely to have an economic impact on existing water user and may impact land values.
		• In some cases, the requirement to surrender 20% allocation in over-allocated water bodies may also have an environmental cost by preventing site-to-site transfers that may have environmental benefits or result in technical efficiency improvements.
		• Having multiple consenting pathways creates a more complex planning framework than option 2.

	BENEFITS	COSTS
	bodies and the ecosystems they support. • Additional water back to the source water body can also support high flows and levels and their variability which can benefit cultural and social values by maintaining and enhancing flows for amenity and recreational opportunities, and the habitats for healthy populations of mahika kai and taoka species (Timms-Dean, McIntyre, Duncan, & Moran, 2024).	
Option 2: Policy & simple rule framework (preferred option)	• Option 2 has fewer consenting pathways than option 1, thereby providing water users with a less complex and clearer planning framework for managing water permit transfers.	• Having a restricted discretionary or non-complying activity status may result in more complex applications processes and increased application costs for proposals for site-to site transfers that are considered relatively low risk.

437. Table 48 below assesses the effectiveness and efficiency of the proposed provisions in achieving the objectives.

Table 41: Effectiveness and efficiency assessment for options to manage transfers of water permits.

Effectiveness	
Option 1: Policy framework & multiple pathways	• Option 1 is considered an effective proposal for achieving the objectives relevant to the EFL chapter. • The proposed policy and rule framework for managing the transfer of water permits is likely be successful at achieving the relevant objective in the EFL chapter, particularly EFL-O1 and the phasing out of over-allocation as it provides clear direction fort applicants and decision makers.
Option 2: Policy & simple rule framework (preferred option)	• Option 2 is also considered an effective proposal for achieving the objectives relevant to the EFL chapter as the proposed provisions are likely to be successful at achieving the relevant objectives for the same reasons described for option 1. • Additionally, the proposal provides an even clearer and simpler consenting framework for managing the environmental risk associated with the transfer of water permits, than option 1.
Efficiency	
Option 1: Policy framework & multiple pathways	• Option 1 is considered the least efficient proposal for achieving the objectives relevant to the EFL chapter. • The proposal on balance has additional cost compared to option 2 which creates a complex planning framework that is likely to generate higher implementation costs that are not justified by the benefits of this approach. • Further to this, the mandatory reductions in over-allocated water bodies required under this option are unlikely to deliver greater benefits for the health of freshwater and freshwater ecosystems than option 2. • However, certain aspects of the proposed framework, such as the mandatory 20 % reductions in allocation for transfers in over-allocated water bodies, may in some

	circumstances act as a disincentive for transfers that could result in ecological improvements (e.g. assist with phasing out overallocation) or improved efficiency in water use. In doing so the proposed framework may have some unintended consequences.
Option 2: Policy & simple rule framework (preferred option)	• Option 2 is considered the more efficient proposal for achieving the objectives relevant to the EFL chapter as on balance it has greater net benefits than option 1. • The policy and rule framework proposed under Option 2 provides a clearer planning framework to manage the transfer of water permits compared to option 1. • While option 2 requires efficiency in water use where site to site transfers are occurring, this option is less rigid and does require a mandatory default reduction of 20 % in allocation in over-allocated water bodies. This provides water users with more flexibility and greater incentive to apply for site-to-site transfers that have an environmental benefit and improve efficiency in water use.

2.14.7. Conclusion

438. Option 2 is the preferred option as it is considered the most appropriate way to achieve the objectives relevant to the EFL chapter. The proposed provides a clear policy and rule framework to manage the transfer of water permits.

2.15. Sub-topic: Managing non-consumptive takes

439. Non-consumptive takes are takes where "the same amount of water is returned to the same water body at or near the location from which it was taken and no significant delay occurs between the taking and returning of the water."[88] A non-consumptive take is exempt from the requirements of the metering regulation and is not subject to take limits set for waterbodies given that what is taken is returned to the source water body. This section evaluates options for managing non-consumptive takes in the pLWRP and focuses on how such takes are defined for the purposes of assessing whether a take is non-consumptive.

2.15.1. Reasonably practicable options

440. Four reasonably practicable options were identified for managing non-consumptive take to achieve the objectives relevant to the EFL chapter:

a. **Option 1:** Rely on definition in Resource Management (Measurement and Reporting of Water Takes) Regulations 2010

b. **Options 2:** Set a definition that provides guidance on the acceptable distance over which water can be taken from a water body.

c. **Option 3:** Set a definition that a provides guidance on the purpose of use of the water taken and on the acceptable distance over which water can be taken from a water body.

d. **Option 4:** Policy framework with assessment criteria

[88] Clause 4, Resource Management (Measurement and Reporting of Water Takes) Regulations 2010

2.15.1.1. Option 1: Rely on definition in Resource Management (Measurement and Reporting of Water Takes) Regulations 2010

441. Option 1 proposes to rely on the definition of non-consumptive take in the Resource Management (Measurement and Reporting of Water Takes) Regulations 2010 (metering regulations).

442. Under this option any application for a non-consumptive water take will be assessed against the definition in the regulation.

443. Under this option the key elements in the assessment of a non-consumptive take are that:

a. the same amount of water is returned.

b. the water is returned to the same water body;(preferred option).

c. the water is returned at or near the location from which it was taken.

d. there is no significant delay between the taking and returning of the water.

2.15.1.2. Option 2: Set a definition that provides guidance on the acceptable distance over which water can be taken from a water body (preferred option).

444. Option 2 proposes to set a more specific definition of non-consumptive take in the pLWRP to provide direction for water users and decision makers. This proposal includes a distance element for the return of water as no greater than 200 m from the point of take.

2.15.1.3. Option 3: Set a definition that a provides guidance on the purpose of use of the water taken and on the acceptable distance over which water can be taken from a water body

445. In addition to the distance element proposed in option 2, option 3 proposes an additional limb to the definition of non-consumptive take to include where the existing “take of water is used solely for hydro electricity generation via an in-stream dam and is returned to the same waterbody.”

2.15.1.4. Option 4: Policy framework with assessment criteria

446. Option 4 proposes a policy framework that sets out assessment criteria for determining whether a take is non-consumptive, including an assessment of the following criteria:

a. Magnitude of the take relative to the size of the stream (see table below);

b. The length of the stream reach affected between the point of take and point of discharge;

c. The time between the taking and discharge of water.

447. Under this assessment a take with low-moderate risk or less according to the criteria in table 47 will be considered non-consumptive.

Table 42: Proposed Risk assessment of the non-consumptive taking of water

		Level of flow alteration (% of natural)				
		<10%	**10-20%**	**20-30%**	**30-40%**	**≥50%**
Length of residual flow	**0-50 m**	Very low	Very low	Very low	Low	Low-moderate
	50-100 m	Very low	Very low	Low	Low-moderate	Moderate
	100-250 m	Very low	Low	Low-moderate	Moderate	Moderate-high
	250-500 m	Low	Low	Moderate	Moderate	High
	500-1000 m	Low	Low-moderate	Moderate	High	High
	>1000 m	Low	Low-moderate	High	High	High

2.15.2. Community and stakeholder feedback

448. There was limited specific feedback received on the proposal for managing non-consumptive takes during community and stakeholder engagement. This is in part due to the technical nature of this topic.

2.15.3. Clause 3 consultation feedback

449. Draft provisions based on option 3 were presented during Clause 3 consultation. There was general support for the proposal by some parties.

450. Despite the general support for option 3, the proposed provision for managing non-consumptive takes were amended because of the uncertain information on the full scale and extent of non-consumptive take in Otago (including takes that are solely for hydroelectricity) and the impacts that this uncertainty may have for the effectiveness and efficiency of implementing option 3. It was considered that a definition more aligned with the metering regulations was more appropriate to manage the uncertainty and risk of unintended consequences.

2.15.4. Clause 4A consultation feedback

451. Iwi authorities sought amendment to draft definition of non-consumptive to provide greater clarity about what is meant by "within a timeframe as near as practicable to when the take is operating."

452. This feedback was considered and while it is appreciated that the proposed definition is less certain, this is considered appropriate to provide some flexibility when considered how quickly water is returned to the waterbody. The proposed definition and requirement also works in conjunction with the requirement to return "the same volume of water as near as practicable to the point of take and no greater than 200m from the point of take.

2.15.5. Effectiveness and efficiency assessment

453. Section 32(2)(c) of the RMA requires ORC to take into account the risk of acting or not acting if there is uncertain or insufficient information. There is some uncertainty in relation to the extent of existing water take that are considered non-consumptive, however, there is also some risk in not acting and establishing a planning framework to manage such takes. For example, there is potentially a high demand for hydro-electricity generation activities that may or may not be non-consumptive.

454. Table 50 below identifies and assesses the environmental, cultural, social, and economic benefits and costs anticipated from implementing the proposed options.

Table 43: Benefits and costs for proposed option for collective management.

	BENEFITS	COSTS
Option 1: Metering regs	• Easy to implement.	• Option 1 likely has economic costs as it provides limited guidance which may lead to increase the costs during the application processes.
Option 2: Definition with distance element (Preferred option)	• Provides clearer criteria to meet definition compared to option 1. This provides a certain assessment and can have economic benefits for water users that can meet this definition as they will not be subject to take limits and the metering regulations. • Treats different water users equally as there is no reference to purpose of use to meet the definition. • More focus on the effects on water body than option 3 which has environmental, social and cultural benefits as site specific effects on FMU values is prioritised within the framework. For example, ensuring environmental outcomes for values such as ecosystem health, mahika kai, wāhi tūpuna and taoka species are considered. • More directive and certain for decision makers which reduce time and costs of applications than option 1.	• Potential economic costs as this may result in a more complex allocation regime. For example, existing water takes previously assessed as non-consumptive may not meet the proposed definition and this may impose additional costs to meet: ○ Water metering regulation requirement, ○ Requirements in over-allocated catchments.
Options 3: Definition based on purpose of use	• Economic benefits as this option creates a more certainty for existing water users that meet the proposed definition. • More directive and certain for decision makers which reduce time and costs of applications than option 1 and 2. • Benefits existing takes that are solely for hydro-electricity generation. • More enabling of water takes for hydroelectric generation which has economic and social benefits as it support community respond and reducing the impacts of climate change.	• A definition based on purpose of use such as takes for hydro-electricity generation is inconsistent with the national regulation and there is a risk of unintended consequences including impacting water quantity accounting and the allocation status of a water body.

	BENEFITS	COSTS
Option 4 Policy framework & assessment criteria	• Provides clear direction for water users and decision makers for assessing whether takes are non-consumptive on a case-by-case basis. • Risk based approach has environmental, social and cultural benefits as site specific effects on FMU values is prioritised within the framework. For example, environmental outcomes for values such as ecosystem health, mahika kai, wāhi tūpuna and taoka species.	• Provides less certainty and increases the complexity of assessing whether a take is non-consumptive or not likely to result in greater costs associated with consent application processes compared to options 2 and 3. • For example, providing for risk assessment of effects on achieving environmental outcomes is already provided for in the EFL policy framework and this create duplication.

455. Table 51 below assesses the effectiveness and efficiency of the proposed options for managing non-consumptive takes in achieving the objectives relevant to the EFL chapter.

Table 44: Effectiveness and efficiency assessment for proposed options for non-consumptive takes.

Effectiveness	
Option 1: Metering regs	• Option 1 is not considered an effective proposal to achieve the objectives relevant to the EFL chapter. • This proposal does not address the known issues and uncertainty relating to assessing whether a take is 'non-consumptive' based solely on the metering regulations definition. • It does not resolve known issues with assessing water takes that are solely based on the definition of 'non-consumptive takes' in the water metering regulations. For example, the Water Plan does not provide clear guidance to assess the key elements of the definition of non-consumptive such as 'at or near location of take' and 'no significant delay.' This creates uncertainty for decision makers and water users
Option 2: Definition with distance element (Preferred option)	• Option 2 is considered an effective proposal for managing non-consumptive takes to achieve the objectives relevant to the EFL chapter. • This option proposes a definition that includes distance element for the return of water thereby creating a more certain framework for assessing non-consumptive takes than option 1.
Options 3: Definition based on purpose of use	• Option 3 is also considered an effective proposal for managing non-consumptive takes to achieve the objectives relevant to the EFL chapter, although it is considered less effective than option 2. • While stipulating in the definition that existing water takes that are solely for hydro-electricity classify as a non-consumptive takes creates a clear and certain definition, this proposal may cause issues and unintended consequences during implementation as some existing hydro-electricity may have been consumptive during past consent application processes.
Option 4 Policy framework & assessment criteria	• Option 4 is also considered an effective proposal for managing non-consumptive takes to achieve the objectives relevant to the EFL chapter, although it is considered less effective than option 2 and 3. While this proposal provides a framework for assessment of non-consumptive water takes it is considerably more complex to implement.
Efficiency	

Option 1: Metering regs	• Option 1 is not considered an efficient proposal to manage non-consumptive takes to achieve the objectives relevant to the EFL chapter. • The likely costs for water users and decision makers given the lack of guidelines for assessment of non-consumptive water takes outweigh the benefits of the relatively straight forward implementation required by this proposal.
Option 2: Definition with distance element (Preferred option)	• Option 2 is considered the most efficient proposal for managing non-consumptive takes to achieve the objectives relevant to the EFL chapter. • The benefits of this option are that it creates a more certain definition of non-consumptive takes which outweigh any potential costs associated with applying a definition that is stricter than the definition in the water metering regulations.
Options 3: Definition based on purpose of use	• Option 3 is not considered an efficient proposal for managing non-consumptive takes to achieve the objectives relevant to the EFL chapter. • The likely costs and potential risks of this proposal outweigh the benefits of a more certain definition.
Option 4 Policy framework & assessment criteria	• Option 4 is not considered the most efficient proposal for managing non-consumptive takes to achieve the objectives relevant to the EFL chapter. • While the proposal establishes a framework for the assessment of non-consumptive takes that will benefit water users and decision makers, these benefits are outweighed by the costs and uncertainty associated with the proposal.

2.15.6. Conclusion

456. Option 2 is the preferred option as it is the most appropriate way to achieve the objectives relevant to the EFL chapter. The anticipated benefits of Option 2 will outweigh the potential costs associated with implementing the proposal.

2.16. Sub-topic: Protecting fish from water intakes

457. This section evaluates different options for managing the protection of fish from the environmental effects associated with water intakes in the LWRP. Fish protection is often achieved by screening water intake structures to ensure the safe passage of desired fish species around, or through, any water intake and within or back to the source water body (Hickford, et al., 2023).

2.16.1. Reasonably practicable options

458. Three reasonably practicable options were identified to ensure the safe passage of desired fish species around, or through, any water intake.

a. **Option 1:** Retain the current planning framework in the Water Plan for preventing fish entering water intakes.

b. **Option 2:** Require fish screening for all water intakes.

c. **Option 3:** Establish a policy framework and assessment criteria to ensure the safe passage of desired fish species around, or through, any water intake and within or back to the source water body (preferred option).

2.16.1.1. Option 1: Retain the current planning framework in the Water Plan for preventing fish entering water intakes

459. Option 1 proposes to adopt the approach for managing fish screening in the pLWRP from the current Water Plan and to include conditions in relevant surface water take rules to prevent fish entering water intakes.

460. Under this option, surface water takes must prevent fish entering water intakes, however, how this must be achieved will be determined on a case-by-case basis.

2.16.1.2. Option 2: Require fish screening for all water takes

461. Option 2 proposes to require all water takes to be subject to fish screening conditions to ensure safe passage of desired fish species.

462. This option proposes make the installation of fish screens for water intakes mandatory for:

a. Permitted activity takes

b. Consented water takes, including those that are piped or include an open channel, water race and/or bypass.

2.16.1.3. Option 3: Establish a policy framework and assessment criteria to ensure the safe passage of desired fish species around, or through, any water intake and within or back to the source water body (preferred option).

463. Option 3 propose a policy framework that sets out the criteria that must be considered when designing, operating and maintaining a water intake to provide for the safe passage for fish around, or through, any intake structure within or back to the source water body.

464. This option sets the following requirements for:

a. Small takes Where the rate of take is 1 L/s or less there are no fish screening requirements.

b. Takes where rate of between 1 litre per second and 5 litres per second or temporary take authorised by permitted activity rules minimum standards require the water take pipe to be:

i. buried a minimum of 150 millimetres beneath the bed and perpendicular to river flow; and

ii. have a 3 millimetres gauze mesh.

465. For water takes greater than 5 litres per second a set of criteria to:

i. ether any fish species or communities are present (including the stage of the fish's life-cycle when it passes past the water take (i.e adult, juvenile, larval)) within an 100 metres radius upstream and downstream of the point of take, or bypass if relevant , taking into account the best available information and where no information is available undertaking a field survey in accordance with best practice;

ii. where there are fish species or communities present in the 100 metres radius as assessed in (1) above, the design must include screening that take into account a series of factors, standards required;

iii. Specific additional criteria to consider for water intakes that includes an open channel, water race and/or bypass.

2.16.2. Community and stakeholder feedback

466. Provisions to protect fish from water intakes has been informed by community and stakeholder feedback throughout the development of the pLWRP. The freshwater values of ecosystem health threatened species, mahika kai, taoka species, and fishing were all identified through the NOF process in all FMU and rohe. The proposal for protecting fish from water intake is targeted towards achieving the environmental outcome for each of the values.

2.16.3. Clause 3 consultation feedback

467. Draft provisions based on option 3 were presented during clause 3 consultation. Feedback received was that stronger direction is needed for when fish are to be screened out, and guidance on when it is appropriate not to do this. The proposed drafting such as "take into account" was considered to give insufficient weight to the need to consider screening.

468. There was no specific feedback received on the draft provisions from iwi authorities.

469. In response to feedback the proposed policy was amended to be more directive toward ensuring the safe passage of desired fish species around, or through, any intake within or back to the source water body.

2.16.4. Clause 4A consultation feedback

470. There was no specific feedback received on the draft provision during clause 4A consultation, so no changes were made.

2.16.5. Effectiveness and efficiency assessment

471. Section 32(2)(c) of the RMA requires ORC to take into account the risk of acting or not acting if there is uncertain or insufficient information.

472. Table 52 below identifies and assesses the environmental, cultural, social, and economic benefits and costs anticipated from implementing the proposed options.

Table 45: Benefits and costs for proposed option for community water supply.

	BENEFITS	COSTS
Option 1: current approach	• Simple to implement. • Provides some environmental benefits and protection of fish species from water intakes. • Provides flexibility for water users to undertake an assessment and prevent fish from entering water intake.	• Economic costs for applicant association with assessment of fish screens with no guidance in the plan on what is required. • This option has environmental, social, and cultural costs as it provides less protection to desired fish species from the effects of some water takes compared to the other options.
Option 2: Fish	• Provides some benefits to the environment as desired fish species are	• Risks of overly prescriptive requirements in some instances. For

	BENEFITS	COSTS
screening of all takes	protected from water intake infrastructure and their passage is provided for. • Provides cultural and social benefits as sets conditions to protects high valued fish species including to threaten species, taoka species and sports fish. • Benefits water users and decision makers as this proposal creates clear and certain and enforceable conditions on the requirements to install and maintain fish screening.	example, requirements for screening in all instances will be costly and result in over engineered or impracticable designs. For example, where flooding is frequent, and debris is impounded by screen and where alternative solutions are available such as design or screening out of stream. • As has occurred in other regions, this option may impose significant costs on water users to design, install and maintain fish screens that are impracticable and ineffective. For example, prescriptive requirements for fish screens were incorporated in the Canterbury regional planning framework. In practice, implementing these requirements was difficult, especially for larger water takes of more than 500L/s. This is primarily because it is a significant engineering exercise to construct a mechanical screen that meets the criteria for larger water takes (Purdon, 2022). • Further to the point above, investigation into the compliance of 32 screens with these requirements and showed a significant level of non-compliance and poor design and maintenance resulting in 90% of the being deemed ineffective (Purdon, 2022).
Option 3: Policy framework & assessment criteria (Preferred option)	• Same environmental, social and cultural benefits as option 2. • Retains some flexibility and avoids an overly prescriptive approach in all circumstances. • Creates clear and certain and enforceable conditions for permitted takes to install and maintain fish screening. • Benefits water users with existing infrastructure that includes an open channel, water race and/or bypass as it allows for appropriate fish screening out of stream. This avoids issues associated with instream screens being filled with debris following high flow or flooding events (Ravenscroft P. , 2023).	• Generally, less costs to water users than option 2. • However, in some instances, the costs to design, install and maintain the appropriate fish screen of an intake may be higher than option 2 for some water users. • This will be the case where an assessment is required as part of a resource consent application process to determine the appropriate way to protect fish from an intake.

473. Table 53 below assesses the effectiveness and efficiency of the options proposed above in achieving the objectives.

Table 46: Effectiveness and efficiency assessment of options for community water supply.

Effectiveness	
Option 1: current approach	• Option 1 is not considered an effective proposal for protecting fish from water intakes to achieve the relevant objectives. This option does not address the known implementation issues of the Water Plan in relation to preventing fish from entering water intakes
Option 2: Fish screening of all takes	• Option 2 is not considered the most effective proposal for achieving the objectives relevant to the EFL. • This option provides a clearer, and more certain and enforceable rule framework than option 1 but will likely not be successful at achieving the environmental outcomes for all FMU and rohe values, given the high costs and burdens of the overly prescriptive approach.
Option 3: Policy framework & assessment criteria (Preferred option)	• Option 3 is considered the most effective proposal for protecting fish from water intakes to achieve the relevant objectives. • This option is considered to provide sufficient direction to protect fish from entering water intakes while providing flexibility for how this is to be achieved on a case-by-case basis. Therefore, this option will likely be successful at achieving the objectives relevant to the EFL chapter.
Efficiency	
Option 1: current approach	• Option 1 is not considered an efficient proposal for protecting fish from water intakes to achieve the relevant objectives. • While this option is simple to implement it will likely result in higher costs for water users and decision makers during the resource consent application process and offer less protection for desired fish species.
Option 2: Fish screening of all takes	• Option 2 proposed a rule framework that is considered a less efficient proposal than options 1 and 3 for achieving the objectives relevant to the EFL. The costs of the proposed prescriptive fish screening rules for all water takes outweigh the benefits of providing some certain conditions.
Option 3: Policy framework & assessment criteria (Preferred option)	• Option 3 is considered the most efficient proposal for protecting fish from water intakes to achieve the relevant objectives. On balance this proposal has the greatest net benefit of all options. • This option benefits the environment alongside water users and decision makers as the proposal provide more direction for assessing the need for fish screening and what is required where screening is needed while avoiding the costs of an overly prescriptive (option 2) or uncertain and overly flexible approach (option 1).

2.16.6. Conclusion

474. Option 3 is the preferred option as it is the most effective and efficient proposal for managing the protection of desired fish from water intakes. The anticipated benefits of Option 3 will outweigh the potential costs associated with implementing the proposal.

3. Managing specific activities

3.1. Introduction

475. This section evaluates the provisions in the EFL chapter that manage specific activities relating to the take and use water. These activities include the following:

a. Permitted activity takes.

b. Change in water use.

c. Community water supply.

d. Collective water management.

e. Managing bore interference.

f. Takes for renewable electricity generation.

3.2. Issues

476. The resource management issues described in 6.12.2. are all relevant to the topics in this section. There are also specific issues with how the Water Plan manages these topics that will be summarised in the next section.

3.3. Status quo policy context (including operative Water Plan)

3.3.1. National Policy Statement for Renewable Electricity Generation 2011

477. The NPS for Renewable Electricity Generation recognises the national significance of renewable energy generation by providing for the development, operation, maintenance and upgrading of new and existing renewable electricity generation activities. Of relevance to the take and use of water, Policy E2 requires regional plans to include objectives, policies and rules which provide for the development, operation, maintenance and upgrading of new and existing hydro-electricity activities. This includes provision for small and community-scale renewable electricity generation activities (Policy F).

3.3.2. Proposed Otago Regional Policy Statement 2021

478. Policy LF-WAI-P1 of the pORPS sets out how decision-makers with respect to freshwater must give effect to Te Mana o te Wai in the Otago context and directs them prioritise:

a. first, the health and well-being of water bodies and freshwater ecosystems (te hauora o te wai) and the contribution of this to the health and well-being of the environment (te hauora o te taiao) together with and the exercise of mana whenua to uphold these,

b. second, the health needs of people, (te hauora o te tangata) interacting with water through ingestion (such as drinking water and consuming resources harvested from the water body) and immersive activities (such as harvesting resources and primary contact), and

c. third, the ability of people and communities to provide for their social, economic, and cultural wellbeing, now and in the future.

479. Policy LF-FW-P7A of the pORPS sets direction for water allocation and use with respect to specific end-uses. The policy recognises the benefits of using freshwater within limits and in accordance with any relevant environmental flows and levels, and requires that over-allocation is either phased out or avoided by:

a. allocating fresh water efficiently to support the social, economic, and cultural well-being of people and communities to the extent possible within limits, including for:

i. community drinking water supplies,

ii. maintaining generation output and capacity from existing renewable electricity generation schemes,

iii. mana whenua customary or cultural needs and activities, and

iv. primary production,

b. providing for spatial and temporal sharing of allocated fresh water between uses and users where feasible.

480. Of relevance to renewable energy generation, Objective EIT-EN-02 requires that the generation capacity of renewable energy generation activities in Otago:

a. is protected and maintained, and where appropriate, increased; and

b. contributes to meeting New Zealand's national target for renewable energy generation.

3.3.3. Overview of Region Plan: Water

481. Chapter 6 of the Water Plan contains objectives and policies for the management of different activities that involve the take and use of water, while Chapter 12 of the Plan includes rules for the take and use of water.

482. Chapter 12 provides a suite of rules for the taking and use of surface water and groundwater across the full spectrum of activity statuses. The majority of water takes that are neither meet the permitted activity rule conditions or that are not prohibited are provided for as restricted discretionary activities, except for some existing community water supplies which have a controlled activity rule pathway. takes and uses and any other takes and uses of water require resource consent.

483. There are several issues with the status quo approach for managing specific activities in the These are categorised as follows:

a. Issues with permitted activity takes

b. Issues associated with a change in water use

c. Issues with provisions for managing community water supplies

d. Issues with provisions for collective water management

e. Issues with provisions for managing bore interference effects

f. Issues with management of renewable energy generation

484. A description of the relevant provisions in the Water Plan that manage specific activities and associated issues are provided below.

3.3.4. Permitted activity takes

485. The Water Plan currently includes permitted activities rules for the following activities:

a. Small takes for domestic needs or drinking water (up to 25,000 Litres/day);[89]

b. Large takes from the main stem of the Clutha River/Mata-Au or Kawarau Rivers, or Lakes Wānaka, Hāwea, Whakatipu Waimāori/Wakatipu, Dunstan or Roxburgh (and groundwater takes within 100 m of these waterbodies) up to 1 million litres/day at a rate up to 100 litre/s;[90]

c. Takes from some artificial lakes;[91] and

d. Other small or temporary takes.[92]

486. The are several issues with permitted activity water take rule framework in the Water Plan, namely:

a. The current rules provide limited scope for managing the effects of water takes and are unlikely to give effect to Te Mana o te Wai.

b. Some rules are very permissive. For example, the permitted activity rules allow for large quantities of water to be taken from the Clutha River/Mata-au and Kawarau River.

c. There is no guidance on what 'reasonable needs' are for domestic needs or animal drinking water;

d. There is not direction on whether minimum flows and take limits (where they exist) apply to all permitted activity takes;

e. There is clear direction on the "stacking" of permitted water takes, which has resulted multiple permitted activity takes and consented takes on one property being exercised at the same time;

f. The full scale and extent of permitted takes is not currently understood and the potential cumulative effect on water bodies is not well understood and cannot be managed by the existing rules. For example, there are no requirements to meter, measure or provide any information to ORC account for water use;

g. Further to the point above, as the location of permitted activity takes are not known, the effects of other activities such as discharge on these takes cannot be manged;

h. The effects of small and temporary permitted takes, such as takes for site dewatering and aquifer testing are not adequately managed and lack appropriate conditions to enable these takes to occur and to manage the effects of these takes;

i. Many of the permitted activity rules lack certainty. For example, the use of phrases such as "the effects are no greater than minor" in the permitted activity rules creates uncertainty and are difficult to ensure compliance with.

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[89] Rules 12.1.2.1, 12.1.2.5, 12.2.2.2

[90] Rules 12.1.2.2, 12.2.2.4, 12.2.2.5

[91] Rule 12.1.2.3

[92] Rules 12.1.1.1 to 12.1.2.3

3.3.5. Change in water use

487. There are no specific provisions in the Water Plan that provide for a change in water use. The Water Plan rules refer to take and use together. The recent Supreme Court decision[93] found that, while the RMA allows for the separation of the take and use of water, where the rules refer to the take and use together, the take and use of water cannot be separated (decoupled) into distinct activities. Consequently, there is no ability to change the use of an existing water permit, and a new consent to take and use water is required in that context.

488. There are issues resulting from the Supreme Court decision for the Water Plan rules, namely:

a. There can be no change in uses on existing resource consents in an over-allocated water body as a new consent is a prohibited activity,

b. The water plan rules preclude a change in use which may have an environmental benefit. For example, a change in water use may:

require less water which can then be returned to the source water body; or

be for an activity that has less effects on the receiving environment.

3.3.6. Community water supply

489. There are specific provisions in the Water Plan that provide for community drinking water supply and reticulated community water supply. The Water Plan identifies some existing community water supplies in schedules 1B (surface water) and 3B (groundwater). Community water supplies in schedule 1B from the requirement are exempt from the requirement to comply with the minimum flows set in Schedule 2 of the Water Plan.

490. There are controlled activity rules available to some existing community water supplies identified in either Schedule 1B (surface water) or Schedule 3B (groundwater). For any community water supply that is not identified in either Schedule 1B (surface water) or Schedule 3B, the general rules for the take and use of water apply.

491. There are a number of issues with the management of community water supply in the Water Plan, namely:

a. The provisions that manage community water supplies not give effect to the higher order planning documents. For example, some community water supplies are exempt from the requirement to adhere to the minimum flows set in the Water Plan and tis does not prioritise the health and wellbeing of water bodies.

b. There is limited guidance on water type of water suppliers meet the criteria as a community water supplier.

c. There is limited direction on matters that community water supplier must manage within their supply network, including environmental improvement and system upgrade to reduce water loss.

[93] Cloud Ocean Water Limited v Aotearoa Water Action Incorporated [2023] NZSC 153

3.3.7. Collective management of water

492. The policy framework in the Water Plan contains a provisions relation to the group management of the take and use of water, with various provisions referring to "water user groups", "water management groups", and "water allocation committees."

493. Water management groups and water allocation committees are descriptors for subcategories or types of water user groups that meet specific criteria set out in the Plan. Collectives of water users that do not meet the criteria for either of these groups are referred to as water user groups. Table 52 below provides an overview of the Water Plan framework for each of these groups.

Table 47: Overview of Water Plan groups

	Group		
	Water user group	**Water allocation committee**	**Water management group**
Definition in the Water Plan	Policy 5.4.12: To promote the establishment of, and support, appropriate water user groups to assist in the management of water resources.	Policy 6.4.12: To promote, establish and support appropriate water allocation committees to assist in the management of water rationing and monitoring during periods of water shortage.	Not defined in the Water Plan.
Formation	No direction in the Water Plan regarding their formation and/or approval.	Water allocation committees are comprised of local representatives of people taking water in the affected catchment and are appointed by Council.	Water management groups are voluntary and established by water users. However, these groups must be approved by Council in accordance with the criteria in Appendix 2A of the Water Plan, which includes that: the Council must be satisfied that the group has an appropriate form and rules and seeks to be responsible to manage specified consents, and evidence is provided that consent holders agree to be bound by the group.
Relationship with Council	No formal relationship with Council.	Subcommittees of Council.	No formal relationship with Council.
Purpose and functions	The explanation to Policy 5.4.12 states that water user groups can assist the Otago Regional Council to manage surface and groundwater resources, with the Council providing	The explanation to Policy 6.4.12 states that water allocation committees are appointed for the purpose of developing and managing water rationing regimes. These	Policy 6.4.12A states that the purpose of water management groups is to assist Council in the management of water by the exercise of at least one of the following functions:

	Group		
	Water user group	**Water allocation committee**	**Water management group**
	hydrological and biological information, and advice on options for managing activities that may affect water quantity, water quality, and the nature of flow and sediment processes. The water user group could also advise the Council on various matters related to the relevant waterbody/ies, including the likely effects of a new take.	committees are tasked with assisting ORC to manage the region's water resources when approaching minimum flows or aquifer restriction levels established by the Water Plan. These committees can support Council by providing hydrological information, and advice on options for rationing to suit particular circumstances, and by enforcing compliance with rationing regimes.	• Coordinating the take and use of water authorised by resource consent. • Rationing the take and use of water to comply with relevant regulatory requirements. • Recording and reporting information to the Council on the exercise of resource consents as required by consent conditions and other regulatory requirements, including matters requiring enforcement. These groups provide flexibility for two or more consent holders to cooperate in exercising their consents, but without the added formality associated with a water allocation committee. Any water rationing decisions made by the group will impact only on those consents held by the group or its members. Consents held by the water management group or its members may be: • managed to an agreed rationing regime; or • held by the water management group; or • contain a condition requiring the consent to be exercised as directed by the water management group.
Existing groups	Various water user groups exist throughout the region, in the form of one water allocation committee, various water management groups, and groups of water users that fall outside these categories.	There is currently only one water allocation committee: the Kakanui Water Allocation Committee. (A second one, the Shag Water Allocation Committee, was established but has ceased to exist).	Various water management groups exist throughout the region. Council does not hold a register of these groups as there is no obligation for them to register with Council.

494. While some of the above terms are defined in the Water Plan, the Plan's provisions for the collective management of water are uncertain and open to interpretation.

3.3.8. Managing bore interference effects

495. The Water Plan aims to avoid adverse effects on existing groundwater users when considering new groundwater take applications. The consent application process for groundwater takes requires applicants to assess the potential bore interference associated with the proposed take as part of the Assessment of Environmental Effects (AEE). Schedule 5B of the Water Plan contains a method for identifying parties likely to be affected by bore interference from a new groundwater take application and determining whether the level of interference is acceptable.

496. There are several issues with the current method for managing bore interference effects under the Water Plan (Levy, Yeo, & Ettema, 2024b), namely:

a. The current approach only considers the calculated interference radius and drawdown thresholds. It does not consider the actual water availability in the bores and the amount of drawdown that they can accommodate based on the bore depth, screen location, water level, and pump placement.

b. The Water Plan defines the drawdown threshold for confined/unconfined aquifers. However, the aquifer type is usually obtained from the ORC databases which may be inaccurate. This classification also does not necessarily account for the heterogeneity in aquifer conditions.

c. The current approach only uses one generic equation for calculating the radius of influence, regardless of the aquifer type (confined/unconfined). However, there are various drawdown models that are tailored for different aquifer types (e.g., Theis, 1935) that may be more suitable for the specific location.

d. The current approach does not consider cumulative interference from other existing takes. It only considers the impact of the proposed groundwater take application.

3.3.9. Takes for renewable electricity generation

497. The Water Plan does not include specific provisions for renewable electricity generation takes, and the general rules for the take and use of water apply.

3.3.10. Summary

498. The Water Plan contains a suite of provision to manage different activities that involve the take and use of water. As described above, there are several issues with many of the aspects of the current planning framework.

3.4. Objectives

499. Section 32(1)(b) requires an examination of whether the provisions in a proposal are the most appropriate way to achieve the objectives. The objectives relevant for this topic are:

a. All of the objectives in the IM – Integrated management chapter, and

b. All of the environmental outcomes included as objectives in chapters FMU1 to FMU5 (including chapters CAT1 to CAT5); and

c. EFL-O1 - Efficiency

3.5. Sub-topic: Permitted activity takes

500. Permitted activity rules enable the take and use of water to occur without a resource consent, provided that certain conditions can be met.

501. The taking of water for a person's reasonable domestic needs or for the needs of a person's animals for drinking water under section 14(3)(b) of the RMA is not an unfettered right. The RMA is clear that fresh water can only be taken for these uses if it does not, or is not likely to, have an adverse effect on the environment. In accordance with the RMA, the options for managing permitted water takes in the LWRP discussed below propose conditions for managing the risk of water takes to the environment and establish the threshold that determines what is "likely to have an adverse effect on the environment". This will ensure that permitted activity rules for the taking of water occur in a way that these takes, both individually and cumulatively, do not have adverse environmental effects.

3.5.1. Discounted options

502. For this topic, the status quo is not considered a reasonably practicable option for the reasons identified above in the 'Overview of the Regional Plan: Water' section above.

3.5.2. Reasonably practicable options

503. Two reasonably practicable options for managing permitted activity takes (that include s14(3)(b) takes) were identified for achieving the objectives:

a. **Option 1**: Reduce permitted activity rate and volumes limits.

b. **Option 2**: Reduce permitted activity rate and volumes limits and restrict to certain uses (preferred option).

3.5.2.1. Option 1: Reduce permitted activity rate and volumes limits

504. Option 1 proposes to set the total limit of water take per landholding according to the size of the water body as follows:

Water body	*7DMALF* for the river	Rate per second	Volume per day
River	<100 L/s	0.5 L/s	2 m^3
	100-500L/s	2 L/s	10 m^3
	500 L/s – 10,000 L/s	5 L/s	20 m^3
	>10,000 L/s	5 L/s	25 m^3
Natural lake	Not applicable	0.5 L/s	2 m^3
Whakatipu Waimāori /	Not applicable	5 L/s	25 m^3

Water body	*7DMALF* for the river	Rate per second	Volume per day
Lake Whakatipu or Lake Wānaka			
Controlled lake	Not applicable	5 L/s	25 m^3

505. This option reduces the total rate and volume of water available as a permitted activity compared to the current permitted activity rules in the Water Plan, but proposes clear and enforceable permitted activity conditions for managing the environmental effects and risks of these takes including conditions that:

a. Provide for only one permitted activity take per landholding.

b. Require the provision of relevant information about the take, such as the location of take and its proposed purpose, to ORC prior to the take commencing.

c. Prevent the "stacking" of permitted activity takes with consented water takes.

d. Provide for fish intake protection.

e. Prevent new permitted activity takes in over-allocated water bodies.

3.5.2.2. Option 2: Reduce permitted activity rate and volumes limits and restrict to certain uses (preferred option)

506. This option proposes to restrict permitted activity takes to certain types of uses and provide specific permitted activity rules for these activities.

507. Options 2 proposes to only provide permitted activity rules for the taking of water for the following uses:

a. Small and/or temporary water takes that include:

i. domestic use and animal drinking water;

ii. takes for aquifer testing;

iii. dewatering;

iv. infrastructure construction and maintenance;

b. non-consumptive takes (including heating or cooling);

c. takes from artificial watercourses.

508. Like Option 1, Option 2 provides clear and enforceable conditions for managing the environmental risks associated with small and/or temporary water takes, including conditions that:

a. Require the provision of relevant information about the take, such as the location of take and proposed purpose of the take, to ORC prior to the take commencing.[94]

[94] For example, see APP25 – Aquifer testing of the pLWRP.

b. Requirement to managing the discharge associated with specific activities, such as dewatering and aquifer testing.

c. Prevent the "stacking" of permitted activity takes with consented water takes.

d. Provide for fish intake protection.

e. Prevent new permitted activity takes in over-allocated water bodies.

f. Appropriate and reasonable limits on the rate and volume of water available to take based on the activity and managing the environmental effects.

3.5.3. Community and stakeholder feedback

509. There was general support for the proposed approach for permitted activities takes based on option 2 by communities and stakeholder as part of the community engagement in the development of the pLWRP. For example, there was support for:

a. the animal drinking water value identified in all FMU and rohe and that this was provided for as a permitted activity take.

b. Providing for activities such as dewatering.

510. There were some views that the proposed permitted actives rules were too restrictive, and that other water uses should also be enable through permitted activity take rules. This included water takes for commercial uses and root stock survival. Further to this, there was concern raised that there needs to be a clear pathway and transition times for existing takes reliant on the permitted activity rules in the water Plan that will require a consent under the EFL chapter to continue taking water.

511. Community and stakeholder feedback has informed the development of the provisions. For example, there have been pathway included for existing takes reliant on the permitted activity rules in the water Plan that will require a consent including in over-allocated water bodies. However, the more restrictive regime was retained as this was considered appropriate to achieve the relevant objectives. For example, activities involving larger water takes such as horticulture often have a greater environmental risk than small take for domestic use and animal drinking water and these effects are more appropriately assessed and be managed through a consenting pathway. Further to this, the pLWRP has provision to enable water storage to provide for root stock survival during time of water restrictions.

3.5.4. Clause 3 consultation feedback

512. Draft provisions based on option 2 were presented during clause 3 consultation. The responses received in relation to the draft permitted activity rules for reasonable domestic use and animal drinking water were mixed. Several parties supported the draft rules noting that the cumulative impacts of domestic and stock takes can amount to substantial amounts of volumes taken from water bodies, while others opposed the draft rules and considered them to be too strict.

513. Key issues and concerns raised in the feedback include the following:

a. Concern about animal welfare given that minimum flow restrictions apply and takes are not permitted in over-allocated zones.

b. Permitted volumes are insufficient for stock.

c. Domestic supplies are not enabled at all times (minimum flow restrictions apply and takes are not permitted in over-allocated zones).

d. Other water uses should be enabled through permitted activity rules including horticultural root stock, small takes for biosecurity purposes and longer-term infrastructure activities.

514. There was no specific feedback received by iwi authorise on the proposed permitted take rules.

515. Following the feedback, amendments were made to the proposed permitted activity take rules to make conditions clearer and more certain. The overall approach as presented during clause 3 consultation was largely retained as it is considered the most appropriate way to achieve the relevant objectives.

3.5.5. Clause 4A consultation feedback

516. Feedback received on the proposed permitted activity take rules included specific request to understand the rational on certain threshold and conditions. For example, in ration to the proposed permitted activity rule for temporary site dewatering, Iwi authorities sought to understand the basis for setting the flow limit at 40 litres per second, and confirmation that this will be sustainable in all circumstances.

517. No changes were made to the draft permitted activity rule for site dewatering. However, in response to the request for information and rationale, it was explained that given the temporary nature of activity combined with the other conditions in the rules that considered that the rates are appropriate. For example, the draft rules include requirements to undertake stream depletion assessment and there are limits on the time that such takes can be undertaken.

3.5.6. Effectiveness and efficiency assessment

518. Section 32(2)(c) of the RMA requires ORC to take into account the risk of acting or not acting if there is uncertain or insufficient information. There is uncertainty and insufficient information on the full scale and extent of permitted activity takes in Otago. There is also considerable risk in not acting as direct and cumulative effects of permitted water takes can impact the health and wellbeing of water bodies.

519. Table 55 below identifies and assesses the environmental, cultural, social, and economic benefits and costs anticipated from implementing the proposed option.

Table 48: Benefits and costs for proposal options for permitted activity takes.

	BENEFITS	COSTS
Option 1: Reduced rates and volumes	• Benefits the environment by: ○ setting limits for permitted activity takes that are based on water body size, thereby managing the risks that water takes can have for instream ecology, particularly for small water rivers.	• The reduction in the total rate of take and volume of water available under the permitted activity rules proposed under this option will likely have adverse impacts on some water users ranging from minor to more significant. • Some existing water users will not be

	BENEFITS	COSTS
	○ Setting clear permitted activity conditions on fish screening of intakes thereby managing the risk to fish species. ○ avoiding future over-allocation and phasing out existing over-allocation. ○ Setting permitted activity conditions requiring the provision of information to ORC on the location of takes, which will assist with freshwater accounting and allow for better management of the cumulative effects of permitted activity takes. • Understanding the location of permitted water takes has social benefits as any potential adverse effect from any proposed activities near that location of the take can be assessed. For example, the effects of discharges near a permitted activity take can be considered during the consent application process. • The requirement to provide information regarding the take to ORC is a cost-effective and reasonable alternative to setting conditions that require the metering or measuring of permitted water takes. • This option has social benefit as it supports an equitable approach that prevents new permitted activity takes occurring from over-allocated water bodies where existing water users are required to restrict or surrender their allocution. • Provides economic, cultural and social benefits as sets appropriate conditions that: ○ protect high valued fish species including to threaten species, taoka species and sports fish. ○ Provide for reasonable water needs of domestic animals and stock.	able to not meet the permitted activity conditions under option 1, as they are more restrictive than those in the operative Water Plan. Those users will need to either reduce their rate of take or the volume of water taken to continue to take water as a permitted activity or apply for a water permit to continue to take water. • In this situation there will be costs to individuals to comply with the new regulatory framework for permitted water takes. These may include costs associated with preparing and processing water permit applications, as well as complying with the various permitted activity conditions in the LWRP. • There are likely to be costs for ORC associated with the implementation and administration of the new provisions. The anticipated increase in the number of water permits to be processed by ORC will have an impact in terms of the administration and resourcing costs, including staffing, to the organisation. • In addition, there will be costs for ORC associated with educating water users and the provisions of information around the new requirements (For example, making relevant information available on website.
Option 2 Restrict by purpose of use (Preferred option)	• Option 2 will likely have the same type of environmental, social, and cultural benefits as option 1. • The proposal to restrict permitted activity takes to certain types of uses and manage each of these types of uses by means of specific rules is also anticipated to benefit the environment as well as individual water users, byt providing a more certain and effective planning framework for some activities, such as site dewatering, that are not provided for in the Water Plan. • Provides clear and enforceable conditions	• Restricting the permitted activity rules to certain uses will likely impact some individual water users. For example, water users that currently take water for uses that are no longer permitted will require a resource consent. This will likely include water users with existing permitted water takes for irrigation from the main stem of the Clutha River/Mata-Au or Kawarau Rivers, or Lakes Wānaka, Hāwea, Whakatipu Waimāori/Wakatipu, Dunstan or Roxburgh (and groundwater takes within 100 m of these

	BENEFITS	COSTS
	for managing the risks of permitted water takes to the environment. This also provides more certainty to water users and will assist with ensuring compliance with the permitted activity conditions. For example, the proposed permitted activity rules for activities such as site dewatering and aquifer testing will set clear condition for water users to follow that also manage the risks of the activity including the discharge of water. • The requirement to provide specific information to ORC may in some instances also benefit individual water users. For example, conditions for aquifer testing that require plans be provided to ORC prior to the take commencing will ensure the testing is conducted correctly. This in turn will may be benefit water users as it avoid the need to repeat the test at a substantial cost to an applicant (if it is done incorrectly).	waterbodies). • As with option 1, it is anticipated that the proposal will increase the number of water permit applications that will need to be processed by ORC. This will have an impact in terms of the administration and resourcing costs (including staffing costs) to the organisation.

520. Table 56 below assesses the effectiveness and efficiency of the proposed options in achieving the objectives.

Table 49: Effectiveness and efficiency assessment for proposed permitted activity rules for the taking and use of water

Effectiveness	
Option 1: Reduced rates and volumes	• Option 1 is considered an effective proposal for achieving objectives relevant to the EFL chapter. This proposal will likely to be successful at address some of the main issues associated with permitted acuity takes, namely the potential cumulative effect that water take (even small) may have on waterbodies and the ecosystem they support by setting condition that manage this risk. For example, condition to provide information to ORC prior to take commencing and clear direction in regards to fully and over-allocated water bodies.
Option 2 Restrict by purpose of use (Preferred option)	• Option 2 is considered the more effective proposal for achieving the objectives relevant to the EFL chapter. • This option will likely be successful at achieving the relevant objectives for the same reason as option 1. Particularly given, the greater restrictions on the taking of water as a permit activity limit than option 1, while still enabling small low risk water take for certain purposes.
Efficiency	
Option 1: Reduced rates and volumes	• Option 1 is considered an efficient proposal for achieving the objectives relevant to the EFL chapter. • As discussed above, this option has several benefits as it proposes cost-effective conditions to manage the risks associated with permitted activity takes, including conditions requiring the provision of information to ORC on the location and of purpose of take. • These permitted activity conditions are considered reasonably justified by the need to

	manage the potential and cumulative effects on land and water from small and/or temporary water takes. (For example, conditions requiring water users with small, permitted takes to provide basic information on small takes is considered more efficient than requiring these water users to wear the costs of installing and operating water metering devices.
Option 2 Restrict by purpose of use (Preferred option)	• Option 2 is considered to the most efficient proposal to achieve the objectives relevant to the EFL chapter. On balance this proposal delivers net benefits to all of society that justify some of the anticipated costs. • A discussed above, this option proposes cost-effective permitted activity conditions to manage the risks associated with permitted activity takes, and enable people to provide for their economic, social and cultural wellbeing within appropriate environmental limits. • The proposal enables permitted activity takes for specified types of uses. This creates a clear and enforceable planning framework for water users and ORC compliance staff.[95] • The proposal helps to improves efficiency of water quantity management in Otago as the more robust rule framework for permitted water takes will improve ORC's understanding of the scale and extent of permitted activity takes in Otago and thereby ensure a better long-term management of water resources. • While it is anticipated that larger water takes currently permitted may now require a resource consent, the cost of consenting is considered reasonably justified as larger water takes tend pose a higher risk for the environment and the effects of these takes should be considered against the policy framework in the EFL chapter, and the wider LWRP.

3.5.7. Conclusion

521. Option 2 is the preferred option as it is the most appropriate way to achieve the objectives relevant to the EFL chapter. Option 2 proposes a more robust planning framework for permitted activity takes that will manage the risks to the environmental while also providing communities and people with an ability to benefit from reasonable water use as a permitted activity.

3.6. Sub-topic: Change in water use

522. Options have been considered which would enable a change in the use of water, recognising that in some cases a change in use can have environmental and community benefits including:

a. Enabling more efficient uses of water;

b. Enabling uses that have less adverse effects on the environment; and

c. A reduction in over-allocation if the new use requires less water.

523. A number of options involving separating the take of water from the use were considered, including:

[95] For example, conditions to inform ORC and provide a pumping plan for aquifer testing assist water users and reduce costs for applicants at later stages of a water permit application as it ensures the aquifer testing plan covers all that is required and these requirements will be conducted during the tests, so as to avoid further costs associated with re-testing.

a. Separating the take and use of water in the rule chapter (e.g. take or use, take and/or use);

b. Stand-alone rule for use only;

c. Separate rules for the take of water and the use of water.

3.6.1. Discounted options

524. For this topic, the status quo is not considered a reasonably practicable option for the reasons identified above in the 'Overview of the Regional Plan: Water' section above.

525. there are no specific provisions in the Water Plan that provide for a change in water use, and the rules refer to take and use together. Under this approach, there is no ability to change the use of an existing water permit, and a new water permit is required to enable a change in water use. [96] The status quo is therefore considered to be a discounted option.

526. All options which separated the take and use of water were also discounted given that a take and use typically occur together, and the amount of water allocated to a take is determined by the use. Considering the taking of water alongside the use enables decision makers to ensure that freshwater is allocated and used efficiently (Policy 11 of the NPSFM) and that the water to be taken and used is reasonable and efficient for its intended use (proposed LWRP objective EFL-O1).

3.6.2. Reasonably practicable options

527. Two reasonably practicable options were identified to provide for the change in water use in a way that achieve the objectives relevant to the EFL chapter:

a. **Option 1:** provide a consenting pathway to allow the use of an existing water permit to change (preferred option).

b. **Option 2:** allow new takes and uses (as a non-complying activity) in over-allocated catchments.

3.6.2.1. Option 1: Provide a consenting pathway to allow the use of an existing water permit to change (preferred option).

528. This option provides a consenting pathway to allow the use of an existing water permit to change. This pathway allows an existing resource consent to take and use *water* to be substituted with a new resource consent for a different use provided:

a. there is no change in the location of the take and the *water* is to be used on the same property or properties as the existing resource consent; and

b. there is no increase in the rate or volume of take; and

c. the existing consent is to be surrendered upon grant of the substituted consent, which will be granted for a term not exceeding that remaining on the existing consent; and

[96] Cloud Ocean Water Limited v Aotearoa Water Action Incorporated [2023] NZSC 153

d. in *over-allocated* catchments, the substituted consent does not allow an increase in actual *water* use.

3.6.2.2. Option 2: Allow new takes and uses in over-allocated catchments

529. This option would provide for new takes and uses of water in over-allocated catchments (as a non-complying activity) to provide a consenting pathway for new uses.

3.6.3. Community and stakeholder feedback

530. The Supreme Court decision was released after the community and stakeholder engagement. The issue of changing water use, and options to address it, had not been identified at this time.

3.6.4. Clause 3 consultation feedback

531. No Clause 3 consultation feedback was received on this issue. At the time that Clause 3 consultation occurred, the Supreme Court decision had only been recently released. The issue of changing water use, and options to address it, had not been identified. The take and use rules included in the LWRP version released for Clause 3 feedback did not provide a consenting pathway for new uses. Instead, a new take and use of water was proposed as a prohibited activity in over-allocated catchments.

3.6.5. Clause 4A consultation feedback

532. Draft provisions to provide for a change in use based on option 1 were presented during clause 4A consultation. There was no specific feedback received so no changes were made to the draft provision following clause 4A.

3.6.6. Effectiveness and efficiency assessment

533. Section 32(2)(c) of the RMA requires ORC to take into account the risk of acting or not acting if there is uncertain or insufficient information.

534. The demand for existing consent holders to change water use in Otago is not well understood. The risk of not acting is that the benefits of changing water use will not be enabled.

535. Table 57 below identifies and assesses the environmental, cultural, social, and economic benefits and costs anticipated from implementing the provisions proposed options for enabling a change in the use of water. The options are:

a. Provide a consenting pathway to allow the use of an existing water permit to change;

b. Allow new takes and uses of water in over-allocated catchments

Table 50: Benefits and costs for change in water use

	BENEFITS	COSTS
Option 1: Provide for	• This option will allow individual consent holders to change and adopt the use of water in response to changing	• There are likely to be costs for ORC if this option results in applications from exiting consent holders to change the use of

	BENEFITS	COSTS
change in use (Preferred option)	circumstances, including climate, economic and regulatory changes. • There can be environmental and community benefits of changing water use, where the changed use is more efficient, has less environmental impact, or requires less water overall.	water.
Option 2: Allow new takes	• This option would enable existing consent holders to apply to change their use of water (through an application for a new resource consent), resulting in the same benefits that have been identified for Option 1.	• This option would allow new takes and uses of water in all catchments, including over-allocated catchments. New takes in over-allocated catchments do not provide for the health and well-being of the waterbody and could impact on the reliability of supply for existing users. • There are likely to be costs for ORC if there is an increase in resource consent applications for new takes and uses of water in over-allocated catchments.

536. Table 58 below assesses the effectiveness and efficiency of the proposed provisions in achieving the objectives.

Table 51: Effectiveness and efficiency assessment for change in use of water

Effectiveness	
Option 1 (Preferred option – consenting pathway)	• Option 1 is effective for achieving the relevant objectives the in pLWRP and implementing the NPSFM. In particular, this option implements the requirement to give effect to Te Mana o te Wai, while ensuring that freshwater is allocated and used efficiently, and communities are enabled to provide for their social, economic and cultural well-being.
Option 2 (Allow new takes)	• While Option 1 achieves most of the relevant objectives in the pLWRP, it is not considered to be the most effective option, because it allows new water takes in over-allocated catchments, which is contrary to the requirement to phase out existing over-allocation.
Efficiency	
Option 1: Provide for change in use (Preferred option)	• Option 1 is an efficient option to achieve the relevant objectives and give effect to national direction. The benefits to the environment and community of allowing existing permit holders to change water use outweigh any potential costs associated with implementing the new framework.
Option 2: Allow new takes	• Option 2 is considered a less efficient way to achieving the relevant objectives in the pLWRP and give effect to national direction, given that it is contrary to the requirement to phase out over-allocation.

3.6.7. Conclusion

537. Option 1 is the preferred option as it is most appropriate way to achieve the relevant objectives. The likely benefits of Option 2 outweigh its anticipated costs, and the proposed

policy framework will safeguard the health and well-being of freshwater while providing a clear consent pathway that allows existing water permit holders to change the use of water.

3.7. Sub-topic: Community water supply

538. The pLWRP defines "community water supply" as:

"water taken and used primarily to supply water for drinking water and domestic use via a reticulated system, and can include water also supplied for other purposes such as institutional, industrial and commercial processing, cultivation, and production of food and beverages and fibre, animal drinking water purposes, amenity irrigation use and fire-fighting activities."

539. The supply of water for drinking and domestic use must constitute at least 50 % of the water supplied".

540. There are a large number of water suppliers in Otago that provide water for a community water supply schemes. Often these schemes provide for a mix of uses, including drinking water, domestic rural, commercial and industrial uses. However, not all existing water suppliers may meet the proposed definition of community water supply.

541. As of December 2023, there are approximately 295 water permits authorising the take and use of groundwater or surface water for a communal water use. Schedule 1B of the Water Plan identifies 62 sites where water is being taken from lakes and rivers and used for public water supply purposes, while Schedule 3B identifies 13 sites where groundwater is being taken for community water supply. However, some of the sites in these schedules are inaccurate and out of date, for example, some of the listed bore are no longer used to provide water supply.

3.7.1. Discounted options

542. For this topic, the status quo is not considered a reasonably practicable option for the reasons identified above in the 'Overview of the Regional Plan: Water' section above.

3.7.2. Reasonably practicable options

543. Two reasonably practicable options for managing community water supply to achieve the objectives relevant to the EFL chapter were identified:

a. **Option 1:** Provide a controlled activity for existing community water suppliers and discretionary for new community water suppliers (preferred option).

b. **Option 2:** Provide the same discretionary activity pathway for all community water suppliers

3.7.2.1. Option 1: Provide a controlled activity for existing community water suppliers and discretionary for new community water suppliers (preferred option)

544. Option 1 proposes a controlled activity pathway for existing community water supplies with specific entry conditions that require that:

a. the take is not from a water body that is over-allocated;

b. the take complies with any environmental flow or level, including minimum flows set in the pLWRP;

c. the total volume of water taken does not exceed the quantity determined by using the efficiency guidelines in the pLWRP;

d. the applicant prepares a water supply strategy[97] as part of their application.

545. Under this option existing water takes for a community water supply that cannot meet the entry conditions for the controlled activity rule or any new takes for a new community supply are a discretionary activity.

3.7.2.2. Option 2: Same consent pathway for new and existing supplies

546. Under Option 2 new and existing water takes for community water supplies are a discretionary activity pathway.

547. As with Option 1, a water supply strategy will need to be prepared and submitted as part of any resource consent application for this activity.

3.7.3. Community and stakeholder feedback

548. During the community and stakeholder engagement throughout the development of the pLWRP there was general support in enabling communities to provide for their drinking water needs while also do this in a way that provides for the wellbeing of water bodies and freshwater ecosystem. This was reflected in the drinking water value identified in all FMU and rohe as part of the NOF process. The proposal aims to give effect to this general direction received during community engagement.

549. A summary of draft provisions based on option 1 were presented during the third round of community engagement and with territorial authorities and there was general support but also some concern with certain aspect of the proposal including the definition on community water supply and how requirements will work in practice. For example, how will requirement to improve efficiency and reduce 'paper' allocation' work alongside provided for the reasonable water need of the community in the future work in practice.

550. In response to community and stakeholder engagement some amendments were made to the clarify the provisions, although the general policy direction and rule framework was largely unchanged.

3.7.4. Clause 3 consultation feedback

551. Draft provisions based on option 1 were presented during clause 3 consultation. There was a mixed response to the proposal, with some parties including territorial authorities supporting the proposal and other parties opposing the proposal, citing that the policy needs to clearly state that community water supplies must occur "within limits."

[97] A water supply strategy is submitted with an application for resource consent to take and use water, and any associated damming, diversion, or discharge of water, for a community water supply, and it must establish a strategy for the water requirements for community water supplies and their communities over the proposed term of the resource consent. See APP24 – Water supply strategy of the pLWRP.

552. There was no specific feedback received by Iwi authorises on the draft provisions to manage community water supply.

553. The feedback was considered, although the proposal as drafted was largely retained with no substantial amendments made as it is considered the most appropriate way to achieve the relevant objectives.

3.7.5. Clause 4A consultation feedback

554. Iwi authorities expressed concern as to whether providing a controlled activity rule is appropriate for this activity and whether matters of control relating to the health and wellbeing of water bodies and freshwater ecosystems are able to be considered and addressed.

555. Iwi authorities considered that the proposed controlled activity rule does not provide for any consideration of effects in respect to the first tier priorities or environmental outcomes for ecosystem health, mahika kai, wāhi tūpuna and taoka species except to the extent these are provided for in the environmental flows and take limits and in provisions for fish passage. The following concerns were raised:

a. Environmental flows and take limits do not address the effects of loss of flow on site-specific values.

b. Some community water supplies include a significant proportion of water that is used for commercial activities, and controlled activity status for community water supply takes could increase that practice in preference to seeking sustainable water sources elsewhere.

c. Although the requirement for a water supply strategy includes a requirement to identify the proportions of water used for drinking water supply and for other uses, controlled activity status provides no ability to decline consent as long as the supply of water for drinking and domestic use is 50% of the supply as required by the definition.

556. This feedback was given particular regard to, however, the proposed controlled activity rule is considered appropriate. Particularly as to meet this pathway an existing community water supplier must meet environmental flows and level, and many are not currently subject to restriction, so this pathway is intended to encourage suppliers to implement improvements to their operation and provide some certainty for community water supply infrastructure investment. Further to this, the setting of site-specific flows to provide for site specific values is a matter of control in the draft rule.

3.7.6. Effectiveness and efficiency assessment

557. Section 32(2)(c) of the RMA requires ORC to take into account the risk of acting or not acting if there is uncertain or insufficient information on the full scale and extent of impacts on existing community water supplier. However, there are risks in not acting as the current planning framework is not achieving the objectives relevant to the EFL chapter.

558. Table 59 below identifies and assesses the environmental, cultural, social, and economic benefits and costs anticipated from implementing the proposed options.

Table 52: Benefits and costs for proposed option for community water supply.

	BENEFITS	COSTS
Option 1: Pathway for existing CWS (Preferred option)	• Likely to have environmental benefits as community water supplies will be subject to environmental flows and levels, such as minimum flows. • Benefits individuals and the wider community for the following reasons: o Provides a more certain consenting pathway for existing community water suppliers and recognises their importance in supporting community wellbeing. o Provides for plans to be developed to make any improvements to an existing community water supply (such as the upgrade or installation of water storage) to enable the supply of water to communities to continue when water restrictions are in place. o Provides benefits for future generations as the water supply strategy will assist with ensuring future supply is sustainable by addressing future supply issues and reasonably foreseeable increases in demand. • By ensuring that community water supplies are subject to environmental flows and levels and limits the proposal contributes to the more effective management of residential development in water short catchments by sending a clear signal around the constraints to future development. • Has long term environmental benefits by avoiding over -allocation, while also ensuring the equitable treatment of all water users. • Provides for environmental, social and cultural values and ensure environmental outcomes for values such as ecosystem health, mahika kai, wāhi tūpuna and taoka species, are considered when effects of community water supply, and setting site-specific river flows if required.	• The proposal makes community water suppliers subject to environmental flows and levels. This may impact on the reliability of water supply for some existing water suppliers. Further to this, additional water storage and infrastructure may be required to meet water supply needs during low flow periods when restrictions are in place. • Imposes more onerous planning requirements on applicants. This is anticipated to result in higher cost associated with preparing and implementing a water supply strategy. • Results in costs for ORC associated with the assessment and compliance monitoring of water supply strategies. • It is anticipated that some existing water supply schemes will not fall within the definition of community water supply in the LWRP. In such instances, existing schemes will be subject to general provisions of the LWRP for managing the take and use of water and not by managed under the framework for community water supplies. An example of this would a water supply scheme that supplies drinking water as a secondary use, and predominantly supplies rural and commercial supply such as irrigation, dairy wash down supply. • Costs on existing community water suppliers where improvements and upgrades are required to meet proposed environmental flows or levels, and efficiency requirements.
Option 2 (Same pathway for all CWS)	• Likely has similar environmental, social and cultural benefit as it: o proposes that community water supplies be subject to environmental flows and levels, such as minimum flows, o ensure environmental outcomes for values such as ecosystem health,	• Will likely impose higher costs on existing community water supplies as it proposes a more stringent consenting pathway where certain conditions cannot be met. • Only providing a discretionary activity pathway for existing community water suppliers creates uncertainty in regard

	BENEFITS	COSTS
	mahika kai, wāhi tūpuna and taoka species, are considered when effects of community water supply, and setting site-specific river flows if required. ○ Treats existing and new community water suppliers equally. ○ Creates a simpler and clearer planning framework for plan users.	to consent renewal processes and the condition that a new resource consent will be subject to. This will result in greater consent renewal costs and impact future planning and investment of system upgrades.

559. Table 60 below assesses the effectiveness and efficiency of the options proposed above in achieving the objectives.

Table 53: Effectiveness and efficiency assessment of options for community water supply.

Effectiveness	
Option 1: Pathway for existing CWS (Preferred option)	• Option 1 is considered an effective proposal for achieving the objectives relevant to the EFL chapter. • Option 1 is likely to achieve these objectives as it provided for community water supplies while ensuring that these activities are carried out within relevant limits and comply with relevant environmental flows and levels.
Option 2 (Same pathway for all CWS)	• Option 2 is considered an effective proposal for achieving the objectives relevant to the EFL chapter. • This proposal is also targeted towards achieving the objectives in the same way as option 1. However, this option is considered less acceptable to the wider community as it does not provide existing community water suppliers with the same level of certainty around the continued operation of these supplies as option 1.
Efficiency	
Option 1: Pathway for existing CWS (Preferred option)	• Option 1 is considered an efficient proposal to achieve the objectives relevant to the EFL chapter. As discussed above, this option has many benefits that out weight any potential costs. • This proposal will ensure environmental flows, levels and take limits are achieved while requiring community water suppliers to prepare water supply strategies in accordance with specified criteria that will improve the technical and allocative efficiency of their water supply network. • This proposal provides community water suppliers with flexibility to determine how they will meet the requirements set by the LWRP through the implementation of a water supply strategy. This allows community water suppliers to plan for future water needs and system upgrades, which will improve the efficiency of the supply network over time, reduce water loss and improve demand management of end users. • The controlled activity status provides a more certain consenting pathway for existing community water suppliers that are meeting specified conditions, thereby better enabling future planning.
Option 2 (Same pathway for all CWS)	• Option 2 is considered a less efficient proposal for achieving the objectives relevant to the EFL chapter than option 1. • This proposal sets the same consenting pathway for all existing and new community water supplies. This pathway is considered to place a higher cost on existing

	community water suppliers than the pathway provided under option 1 and has a significant impact on their long-term planning as it creates uncertainty around the future reconsenting of the community water supply. These costs and risks are not considered justified, especially in instances where a community water supply can operate in way that meets environmental flows, levels and take limits.

3.7.7. Conclusion

560. Option 1 is the preferred option as it is considered the most appropriate way to achieve the objectives relevant to the EFL chapter. The likely benefits of Option 1 outweigh its anticipated costs, particularly by providing transition pathways for existing community water suppliers where these are required to achieve the environmental flows, levels and take limits.

3.8. Sub-topic: Collective management of water

561. Providing for the collective management of the take and use of water can support achieving the objectives relevant to the EFL chapter. For example, water sharing between water users during low flow periods can avoid rivers reaching restrictions or reduce the time that restrictions are in place. Collective management of water use can also help people and communities to reduce the impact of climate change on water availability (Ward & Russell, 2010). Further to this, the pORPS requires water allocation and use to provide for the spatial and temporal sharing of allocated fresh water between users and uses where feasible.[98]

3.8.1. Discounted options

562. For this topic, the status quo is not considered a reasonably practicable option for the reasons identified above in the 'Overview of the Regional Plan: Water' section above.

3.8.2. Reasonably practicable options

563.

564. Two reasonably practicable options to provide for the collective management to achieve the objectives relevant to the EFL chapter were identified:

a. **Option 1**: Policy direction for collective management (preferred option).

b. **Option 2**: Policy and rule framework for collective management.

3.8.2.1. Option 1: Policy direction for collective management (preferred option).

565. Option 1 proposes a policy framework that supports the collective management of water either through the formation of a single entity, such as an irrigation scheme, or through the establishment of water user groups formed between multiple water permit holders.

566. Under this option the take and use of water for supplying an irrigation scheme will be provided for by the general take and use rules.

[98] LF-FW-P7A(6)

567. This option requires the following information to be provided to ORC to support consent applications:

a. Irrigation scheme management plans,[99] with mandatory inclusion of the following information: a description of all the catchments within the irrigation scheme command area, a comprehensive description of where and how the scheme operates, and any relevant objectives the irrigation scheme is to be managed in accordance with.

b. Information on how water user group agreements are to be managed and achieve environmental flows and levels (amongst all water permit holders in the group)

3.8.2.2. Option 2: Policy and rule framework for collective management

568. In addition to providing policy direction for the collective management of water, Option 2 proposes specific rule pathways for the take and collective use of water.

569. This option proposes a restricted discretionary activity rule pathway for the take and use of water by an irrigation scheme provided they meet conditions to provide information on:

a. efficiency requirements in relation to the conveyance and use of water;

b. scheme management plan to address methods to allocate to users;

c. command area;

d. scheme operation;

e. monitoring requirements.

570. Where any of the conditions above cannot be met the take and use of water by an irrigation scheme will be a discretionary activity.

3.8.3. Community and stakeholder feedback

571. A theme from community and stake holder engagement in the development of the pLWRP is that community led solutions to managing water quantity should be enabled, particularly in water short catchments. Existing water user group were highlighted as an effective way that water users can work together to manage their water use for the benefit of the environments and their group members. Catchment based management approaches was viewed by many to allow for community collaboration and ownership of environmental issues and solutions.

572. The proposal for the collective management of water has been developed to enable water sharing and collectives means to achieve environmental flows, levels, and take limits.

3.8.4. Clause 3 consultation feedback

573. Draft provision based on option 1 were presented during clause 3 consultation. There was general support for the proposal and no changes made to the draft provisions as a result of the feedback. There was no specific feedback from iwi authorities on the proposal.

[99] See APP22 – Scheme management plan of the pLWRP

3.8.5. Clause 4A consultation feedback

574. There was no specific feedback received on the draft provisions during clause 4A consultation, so no changes were made.

3.8.6. Effectiveness and efficiency assessment

575. Section 32(2)(c) of the RMA requires ORC to take into account the risk of acting or not acting if there is uncertain or insufficient information. While the current scale and extent of collective water management in Otago is well understood (see section 3.3.3 above), the level of future demand for collective management of water is uncertain. The risk of acting now is considered low given that the options proposed are designed to provide for and encourage collective management of water and not set mandatory requirements.

576. Table 59 below identifies and assesses the environmental, cultural, social, and economic benefits and costs anticipated from implementing the proposed options.

Table 54: Benefits and costs for proposed option for collective management.

	BENEFITS	**COSTS**
Option 1: Policy framework (Preferred option)	• Support the achievement of environmental flows and levels through collective management and water sharing. • Provides policy direction to support collective water management and contributes to achieving environmental flow and levels as collective management can be effective in managing low flow restrictions. This supports water permit holders to effectively share, and ration water use to meet environmental flows and levels while providing for their water needs. This in turn can further promote efficient water use among water permit holders (Crutchley, 2018). • Better low flow management supports healthy flows and levels that can provide for freshwater values such as ecosystem health mahika kai, wāhi tūpuna and taoka species. • Collective management of water use can better support environmental improvement by providing for the coordination and management of activities at a larger scale than would be the case if these actions were carried out at the scale of a single landholding (Ward & Russell, 2010). • Supports collective management of water through a single entity, such as an irrigation scheme. This proposal is anticipated to provide economy of scale effects that:	• Potentially higher costs associated with an application, given the comprehensive matters that must be supplied as part of the scheme management plan. • Irrigation schemes (and their members) may have increased overhead costs associated with the overall management of the take and use of water by the scheme.

	BENEFITS	COSTS
	○ reduce resource consent processing costs for members; ○ reduce administrative and consent audit/monitoring costs for water users and ORC; ○ promotes shared investment in water infrastructure thereby reducing costs associated with the establishment, upgrade and maintenance of infrastructure. ○ Provides for the sharing of water between individuals and can allow many users to continue to take water at times of low river flows to preserve crops. • The proposed general regionwide rule framework creates a relatively simpler planning framework to implement.	
Option 2: Policy and rule framework	• In addition to benefits discussed above, the proposed restricted discretionary rule benefits water users as it provides a more certainty application process with clear conditions to be met.	• Potentially creates a more complex planning framework to implement.

577. Table 60 below assesses the effectiveness and efficiency of the proposed provisions in achieving the objectives.

Table 55: Effectiveness and efficiency assessment for proposed option for collective management.

Effectiveness	
Option 1: Policy framework (Preferred option)	• Option 1 is considered an effective proposal as it supports the use of land and freshwater in a manner that will contribute to achieving the objectives relevant to the EFL chapter. The proposal will likely be successful as it seeks to support the collective management of water as a means of contributing to achieving environmental flows, and levels set for water bodies. • The proposal provides clear direction on what is required and expected by water users within a collective. The proposal is considered feasible to implement as it outlines the information that applicants are required to provide to ORC as part of their application.
Option 2: Policy and rule framework	• Option 2 is also considered an effective proposal that will be successful at for achieving the objectives relevant to the EFL chapter. The prosed rule framework proposed under option 2 provides a certain consent pathway with clear conditions for irrigation schemes to meet.
Efficiency	
Option 1: Policy framework (Preferred	• Option 1 is considered an efficient proposal for achieving the objectives relevant to the EFL chapter. The proposal supports the collective management of water and promotes economies of scale to improve the environment and water use. • The environmental benefits alongside the benefits for individual water user are

option)	considered to outweigh any potential costs associated with implementing the new policy framework. • The proposed policy framework supports the sharing of water between users and allows for agreements that can improve the rationing of water but also the productive efficiency of the water use as water user groups can negotiate among themselves for high priority use or for access to water during time of low flow or restrictions for high value uses. • The policy direction provides clarity on the type of information that is expected to be provided to ORC by a resource consent applicant, which will assist in a more efficient application process. • The scheme management plans that are required to be developed under option 1 will allow for improvements to water supply schemes to be phased in, which can improve the efficiency of this scheme over time.
Option 2: Policy and rule framework	• Option 2 is considered less efficient for achieving the objectives relevant to the EFL chapter than option 1. While this option also has benefits, it is considered that relying on a clear and directive policy direction as proposed in option 1 will provide a more efficient planning framework.

3.8.7. Conclusion

578. Option 1 is the preferred option as it is considered the most appropriate way to achieve the objectives relevant to the EFL chapter. As discussed above, this option provides a policy framework that will support the collective management of the take and use of water.

3.9. Sub-topic: Managing bore interference

579. Managing the bore interference effects of a ground water take is important for ensuring surrounding bores are adequately considered in decision-making on resource consent applications (Levy, Yeo, & Ettema, 2024b). The current consent application process for groundwater takes under the water Plan requires applicants to assess the potential bore interference associated with the proposed take as part of the Assessment of Environmental Effects (AEE).

3.9.1. Reasonably practicable options

580. Two reasonably practicable options for managing bore interference effects to achieve the objectives relevant to the EFL chapter were identified:

a. **Option 1**: retain current planning framework

b. **Option 2**: update the framework for managing bore interference to be in line with current best practice (preferred option).

3.9.1.1. Option 1: retain current planning framework

581. Option 1 proposes to retain the current approach to managing bore interference effects in the operative Water Plan (see section 3.3.3 above for a description of the Regional planning framework).

3.9.1.2. Option 2: Update in line with best practice (preferred option)

582. Option 2 proposes to update the policy and methods relating to assessing the effects of groundwater takes currently included in the operative Water Plan to better reflect best practice and resolve issues with implementing the status quo. See APP23 – Determining the interference effects of a groundwater take of the pLWRP.

583. This option proposes to require the following:

a. Inclusion of an updated method in the LWRP for determining bore interference effects that defines "acceptable interference" based on a proportion of the available drawdown in surrounding bores;

b. New bores to adequately penetrate[100] an aquifer to be consider affected;

c. the drawdown from the proposed groundwater take to be calculated based on the proposed rate/volume and a set consistent pumping duration;

d. An assessment of the cumulative impacts of the take to be included in the resource consent application; and

e. The assessment is done on all bores within a specific, conservative radius from the proposed take, for example, 2km.

3.9.2. Community and stakeholder feedback

584. A theme throughout community and stakeholder engagement in the development of the pLWRP is that Otago's freshwater resources should be manged effectively and efficiently, and that many in the community rely on freshwater for their wellbeing. The proposal for managing bore interference effects has been developed to ensure the effective and effect management of Otago's groundwater resources and support the ability of people who use this resource to provide for their wellbeing.

3.9.3. Clause 3 consultation feedback

585. Draft provisions based on option 2 were presented during clause 3 consultation. There was limited specific feedback received on the draft provisions for manging bore interference although there was some support for the matters in the proposal. The draft provisions were retained as consulted on following the feedback received.

3.9.4. Clause 4A consultation feedback

586. There was no specific feedback received on the draft provision for managing bore interference, so no changes were made following clause 4A consultation.

[100] A bore will be classified as adequately penetrating an unconfined aquifer where the top of the screen (i.e. the interval over which groundwater enters the bore or well) is located at a depth exceeding 3 times the average seasonal groundwater level variation below the mean groundwater level (i.e. A >3 x B). For the purpose of determining the interference effects of a ground water take, any existing and lawfully established bore prior to notification date of pLWRP will be consider adequately penetrating.

3.9.5. Effectiveness and efficiency assessment

587. Section 32(2)(c) of the RMA requires ORC to take into account the risk of acting or not acting if there is uncertain or insufficient information. While there is uncertain information on the full scale and extent of impacts of the proposed options. Given the known limitations of the status quo, it is considered that there is some risk posed by not acting to improve the management framework for bore interference.

588. Table 63 below identifies and assesses the environmental, cultural, social, and economic benefits and costs anticipated from implementing the proposed option for managing bore interference.

Table 56: Benefits and costs of proposed options for managing bore interference.

	BENEFITS	COSTS
Option 1: Current approach	• Retaining the current planning framework avoid any costs associated with the implementation of a new management approach.	• Known issues with implementation of status quo are not resolved.
Option 2: update with best practice (Preferred option)	• Supports a more robust framework and prescribes more accurate assessments. For example, under this option groundwater takes will be assessed based on available water in the surrounding bores rather than an arbitrary threshold that can be overly restrictive (Levy, Yeo, & Ettema, 2024b). • Benefits applicants as provide as it provides a more accurate assessment on water availability (Levy, Yeo, & Ettema, 2024b). • Supports adequate bore construction and reduces the risk that bores are drilled too shallow to be considered affected (Levy, Yeo, & Ettema, 2024b). This has social benefits as it ensure that neighbouring bore are not adversely impacting each other's water supply. • A more robust framework supports more effective groundwater management and improves the understanding of the effects of ground water takes on surface water bodies that support wider freshwater values such as ecosystem health, and the freshwater habitat of threatened species and taoka species. • This in turn support the achievement of environmental flows, levels and take limits set for groundwater and connected surface water bodied and achieving the environmental outcome for FMU and rohe values.	• Option 2 will likely result in greater costs to water users, including costs associated with the requirement for applicants to undertake robust scientific assessments restrictive (Levy, Yeo, & Ettema, 2024b). • There will be cost associated with education and adjusting to new requirements for ORC and private practitioners (Levy, Yeo, & Ettema, 2024b).

589. Table 64 below assesses the effectiveness and efficiency of the proposed options in achieving the objectives.

Table 57: Effectiveness and efficiency assessment of proposed options for managing bore interference.

Effectiveness	
Option 1: Current approach	• Option 1 is not considered an effective proposal as it does not address the known issues and limitation of the current approach for assessing bore interface effects (Levy, Yeo, & Ettema, 2024b). Therefore, this proposal is unlikely to be a successful at achieving the objectives relevant to the EFL chapter.
Option 2: update with best practice (Preferred option)	• Option 2 is considered an effective proposal for achieving the objectives relevant to the EFL chapter. • Option 2 proposes to manage bore interference effects from groundwater takes by establishing a more robust framework that requires accurate assessments to be undertaken. • This proposal will likely result in a more fit for purpose planning framework for managing bore interference.
Efficiency	
Option 1: Current approach	• As discussed above, Option 1 is considered to have relatively low initial implementation costs given that is proposed to adopt the status quo approach for managing bore interference effects. • However, the longer-term costs associated with retaining the ineffective current approach, outweigh the benefits. Therefore, this option not considered an efficient proposal for achieving the objectives relevant to the EFL chapter.
Option 2: update with best practice (Preferred option)	• Option 2 is considered an efficient proposal for achieving the objectives relevant to the EFL chapter. • The benefits of establishing a more fit-for-purpose management framework for bore interference outweigh the anticipated costs of adopting this new management approach.

3.9.6. Conclusion

590. Option 2 is considered the most appropriate way to achieve the relevant objectives of the EFL chapter. This proposal establishes a more fit-for-purpose planning framework for managing bore interference. As discussed above, the benefits of this proposal outweigh any of the anticipated costs associated with adopting a new approach to manage bore interference.

3.10. Sub-topic: Takes for renewable electricity generation

591. Renewable electricity generation includes hydroelectricity activities that involve the taking and use of water. Renewable electricity generation facilities in Otago contribute a large portion of regional and national energy requirements. This includes the nationally significant Clutha hydroelectricity generation scheme and the Waipōuri hydro-electricity generation scheme, as well as the regionally significant Deep Stream and Paerau/Patearoa hydro-electricity generation schemes. There are also numerous existing smaller scale hydro-electric schemes occurring across Otago.

592. This section evaluates options for managing the taking of water for renewable electricity generation.

3.10.1. Discounted options

593. For this topic, the status quo is not considered a reasonably practicable option for the reasons identified above in the 'Overview of the Regional Plan: Water' section above.

3.10.2. Reasonably practicable options

594. Two reasonably practicable options were identified for managing takes for renewable electricity generation:

a. **Option 1**: Apply the general take and use rules to renewable electricity generation activities, with the same consenting pathway for existing and new takes.

b. **Option 2**: Bespoke rules for renewable electricity generation takes, with a different consenting pathway for existing and new takes (preferred option).

3.10.2.1. Option 1: Apply the general take and use rules to renewable energy generation activities, with the same consenting pathway for existing and new takes

595. Option 1 proposes to provide for the take and use of water for renewable electricity generation activities under the general take and use rule framework proposed for the pLWRP.[101] The general rules classify new and existing takes as discretionary activities if they are:

a. either non-consumptive or comply with the relevant take limits; and

b. comply with the relevant environmental flows and levels.

596. Water takes which do not comply with these requirements are classified as non-complying activities if they are existing takes, and prohibited activities if they are new.

3.10.2.2. Option 2: Bespoke rules for renewable electricity generation takes (preferred option)

597. Option 2 proposes a bespoke set of rules for the take and use of water for renewable electricity generation activities The proposed rules provide different consenting pathways for existing and new takes, including a controlled activity pathway for existing takes where the take and use:

a. is non-consumptive or complies with the relevant take limits and environmental flows; and

b. complies with fish passage requirements and any relevant Water Conservation Orders.

598. Under this option, existing activities that do not comply with the controlled activity rule are treated as discretionary activities.

[101] The EFL chapter proposes specific rules for a limited number of activities, such as takes for domestic and animal drinking water, dewatering, and community water supply. All other takes and uses of water fall under general rules.

599. For new takes, the rules provide a discretionary activity pathway for new renewable electricity generation takes that are non-consumptive or comply with the relevant take limits and environmental flows. New takes that do not comply with these requirements are treated as non-complying activities.

3.10.3. Community and stakeholder feedback

600. During community and stakeholder engagement many in the community expressed support for the maintenance and development of hydro-electricity generation activities in Otago. Although some in the community expressed concerns that this should occur within limits and in a way that provides for the wellbeing of water bodies and freshwater ecosystem. This general support is shown by the fact that hydro-electricity generation was identified as a value in all FMU and rohe during the NOF process. Stake holders, particularly electric generators expressed the view that the pLWRP should be enabling of hydro-electricity generation activities.

601. In response to community and stakeholder feedback, the proposal has been developed to create an enabling framework while also setting clear parameters that takes for hydro-electricity are subject to environmental limits.

3.10.4. Clause 3 consultation feedback

602. Draft provisions based on Option 1 were presented during Clause 3 consultation. Feedback was received from renewable electricity generators who largely supported the specific policy recognition of the importance of renewable electricity generation. However, there was opposition to the proposed rule framework and feedback seeking recognition of the regional and national importance of renewable electricity generation through a more enabling bespoke framework. Other parties also expressed concern and stated that the draft plan should be clearer to ensure all water use is within the same limits. There was no specific feedback received on the draft provisions from iwi authorities.

603. Option 2 was developed after clause 3 consultation to respond to this feedback.

3.10.5. Clause 4A consultation feedback

604. The following feedback was received during clause 4A consultation on the proposed rules for renewable electricity generation takes:

a. The rule does not provide for any consideration of effects in respect to first tier priorities or environmental outcomes for ecosystem health, mahika kai, wāhi tūpuna and taoka species except to the extent these are provided for in the environmental flows and take limits.

b. Environmental flows and take limits do not address the effects of loss of flow on site-specific values.

605. Iwi authorities sought that activity status be amended to restricted discretionary and include matters for discretion relating to achievement of the environmental outcomes.

606. In response to this feedback, a matter of control to provide for consideration of effects in respect to the first-tier priorities was added. However, the controlled activity pathway was

retained as it is considered appropriate in order to give effect to higher order planning instrument.

3.10.6. Effectiveness and efficiency assessment

607. Section 32(2)(c) of the RMA requires ORC to take into account the risk of acting or not acting if there is uncertain or insufficient information. The extent of renewable generation activities in Otago is well understood and the risk of acting is considered low given that the rules provide for hydroelectricity generation within limits to protect the health and wellbeing of rivers.

608. Table 65 below identifies and assesses the environmental, cultural, social, and economic benefits and costs anticipated from implementing the proposed options for managing water takes for renewable electricity generation. These options are:

a. General take and use rules which apply to renewable energy generation activities.

b. Bespoke rules for renewable energy generation activities

Table 58: Benefits and costs for proposed option for renewable electricity generation

	BENEFITS	COSTS
Option 1: General rules	• Manages the effects of hydroelectricity generation and provides a high level of protection for rivers and ecosystems they support, including avoiding new takes that don't comply with environmental flows and take limits. • Benefits individuals and the wider community by enabling renewable electricity generation. • Provides a relatively clear and simple consenting framework for renewable electricity generation takes, with the same consenting pathway for existing and new takes.	• This option does not enable new renewable generation activities that do not comply with environmental flows and take limits, and less enabling of existing activities (particularly small-scale hydro generation) (Walsh & McMinn, 2024). • A less certain consenting pathway for existing takes that do not comply with environmental flows and take limits could impose more costs on the community and individuals. • Requiring compliance with environmental flows and take limits could reduce reliability of supply for renewable generation activities.
Option 2: Bespoke rules (preferred option)	• Manages the effects of hydroelectricity generation while recognising and providing for new and existing hydroelectricity generation. • Bespoke rules allow the specific effects of renewable electricity generation takes to be managed (such as the effect of non-consumptive takes). Recognises • the importance of renewable electricity generation, which aligns with national direction, and benefits individuals and the wider community by providing for renewable electricity generation activities. • Supports renewable electric development which contributes to reducing the impact of climate change.	• A more enabling consent pathway for new activities does not necessarily provide the same high level of protection for rivers as Option 1. • Requiring compliance with environmental flows and take limits could reduce reliability of supply for renewable generation activities. • Providing more certain consent pathways for renewable electricity generation activities may reduce consenting costs compared to Option 1 (and the status quo).

	BENEFITS	COSTS
	• Distinguishes between existing and new hydroelectricity generation activities, and includes a more certain consent pathway for new and existing activities; and • Provides a relatively clear and simple consenting framework for renewable electricity generation takes. • Environmental, social and cultural benefits as proposed policy and rule framework provides for the consideration the effects on first tier priorities or environmental outcomes such as ecosystem health, mahika kai, wāhi tūpuna and taoka species.	

609. Table 66 below assesses the effectiveness and efficiency of the options proposed above in achieving the objectives.

Table 59: Effectiveness and efficiency assessment of proposed options for renewable electricity generation

Effectiveness	
Option 1: General rules	• While Option 1 is not considered the most effective proposal for achieving the objective relevant to the EFL chapter. Option 1 is not particularly enabling of new hydroelectricity generation activities which is less likely to achieve national direction relevant to hydroelectricity generation. In addition, it provides a less certain consenting pathway for existing activities, compared to Option 2.
Option 2: Bespoke rules (preferred option)	• Option 2 is effective for achieving the relevant objectives in the pLWRP and implementing the NPSFM and NPSREG. This option implements the requirement to give effect to Te Mana o te Wai, while providing for the development, operation, maintenance and upgrading of new and existing renewable electricity generation activities.
Efficiency	
Option 1: General rules	• Option 1 is considered a less efficient way to achieving the relevant objectives in the pLWRP and give effect to national direction, given that it is less enabling of renewable electricity generation.
Option 2: Bespoke rules (preferred option)	• Option 2 is considered an efficient option to achieve the relevant objectives and give effect to national direction. As discussed above the net benefits outweigh the potential costs. For example, enabling new and existing hydroelectricity generation outweigh any potential costs associated with implementing the new framework. • This option will improve efficiency for consent applicants and ORC staff, with clear direction and guidance for the take and use of water for renewable electricity generation, and bespoke policies and rules that address the effects of these takes.

3.10.7. Conclusion

610. Option 2 is the preferred option as it the most appropriate way to achieve the relevant objectives. The likely benefits of Option 2 outweigh its anticipated costs, and the proposed policy framework will safeguard the health and well-being of rivers while providing a clear consent pathway for existing and new hydroelectricity generation activities.