

Proposed Plan Change 5C to the Regional Plan: Water for Otago

## **Manuherikia Integrated Water Management**



# **Background Information**

February 2017

# 1. Introduction and Purpose of Paper

The Council is undertaking a plan change to the Regional Plan: Water for Otago to manage the quantity of water in the Manuherikia catchment.

This Background Information Paper summarises the history and current state of the catchment. The paper includes background information relating to the factors/values that will be considered throughout development of the plan change through to notification.

## 2. Legislative Context

This section summarises the relevant legislation and policy for this plan change.

### 2.1 Resource Management Act 1991

The Resource Management Act 1991 (RMA) is the key piece of legislation that governs resource management in New Zealand. The RMA requires Council to set levels and flows for water bodies if appropriate and to give effect to any National Policy Statement.

### 2.2 National Policy Statement for Freshwater Management 2014

The National Policy Statement for Freshwater Management 2014 (NPSFM) sets out further regulations to sustainably manage freshwater. The NPSFM requires Council to set 'environmental flows and/or levels' for every water management unit and to phase out over-allocation and ensure efficient water use. Council must update plans to give effect to the NPSFM by 2025.

### 2.3 Regional Plan: Water for Otago

The Regional Plan: Water for Otago (the Water Plan) has policies and methods to progressively set minimum flows and groundwater levels for all Otago catchments. Proposed Plan Change 5C Manuherikia Integrated Water Management (the plan change) is one of these projects. The plan change will set minimum flows for surface water and connected groundwater, minimum levels for aquifers and allocation limits for consented water takes (both for surface water and groundwater).

There are a number of 'deemed permits' in Otago that originated as a right to take water for gold mining in the 1800s. These are now predominantly used for irrigation. The deemed permits have a priority system for taking water based on the order they were first granted (resource consents have no priority system). Deemed permits do include a limit on the maximum water take, however they do not include conditions such as minimum flows. Under the RMA these expire in 2021. Holders of these permits must apply to replace their take with a resource consent. The timing of this plan change has been prioritised to ensure as much certainty as possible for those applicants replacing deemed permits before 2021.

## 3. Environmental Context

### 3.1 Location, landscape, and geography

The Manuherikia catchment (3033km<sup>2</sup>) is located in Central Otago. Its headwaters are in the Hawkdun Range, Saint Bathans Range and the Dunstan Mountains. The Manuherikia River main stem (the main stem) flows in a south-west direction to join the Clutha Mata-Au River at Alexandra. Falls Dam is located on the main stem approximately 40km upstream of Ophir. The catchment is divided into two major sub-catchments by the central Raggedy Range.

On the western side there are several medium sized streams contributing water to the main stem from the Dunstan Mountains namely, Dunstan Creek, Thompsons Creek and Chatto Creek.

The Ida Valley lies to the east of the catchment. Water from Rough Ridge and North Rough Ridge drain through the Ida Burn and Poolburn Creeks and run through the Poolburn Gorge, connecting with the main stem north of Lauder.

In the south of the catchment the Manorburn flows northwest from the Manorburn Reservoir and Greenland Reservoir and meets the Manuherikia River south of Galloway.



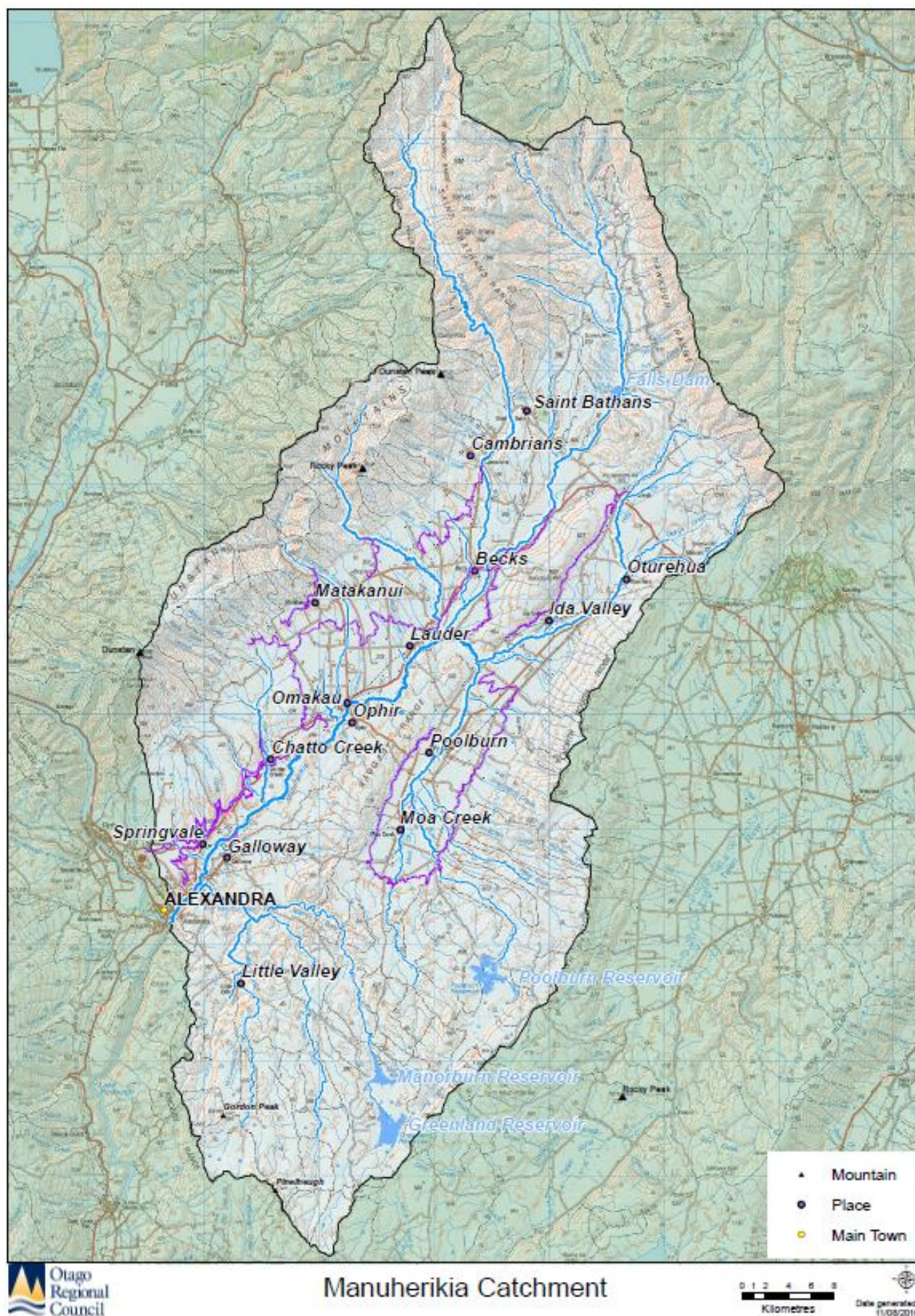
Manuherikia confluence (where it meets the Clutha Mata-au at Alexandra)

### 3.2 Climate

The climate of the Manuherikia catchment is continental and characterised by cold winters and warm, dry summers. Frosts can last for several days during winter and winter temperature can reach as low as -20°C. Summer temperatures can reach 38°C.

Rainfall varies with more rainfall occurring during summer than winter. The catchment is sheltered from rain-bearing winds due to its distance from the sea and the surrounding mountain ranges. The valley floor is semi-arid, receiving 350mm – 500mm of rainfall per year. The western and northern ranges can receive over 1100mm per year. The catchment can occasionally experience flooding with four being recorded since formal records began in 1971.





## 3.3 Hydrology

### 3.3.1 Surface water

The hydrology and natural state of water in the catchment is complex because of the presence of storage reservoirs and Falls Dam that modify the natural flow of water due to their storage and release of water. Water is stored by companies in these reservoirs and the streams and main stem are used to transport this water down the catchment into irrigation races. This results in augmented (artificially reduced or increased) flows.

Falls Dam, is the most influential on the main stem of the Manuherikia, especially during the irrigation season (October to April). Flows immediately below Falls Dam can be significantly higher than would be expected in low flow periods due to water release. Flows further downstream are often lower than natural flow due to heavy abstraction for irrigation.

A key tool used to understand the flow of a river is to calculate the Mean Annual Low Flow (MALF). MALF is calculated by taking the 7 days of continuous lowest flow for each year and finding the mean flow over all of the years recorded. This calculation produces a figure that represents the lowest the river is likely to flow at naturally.

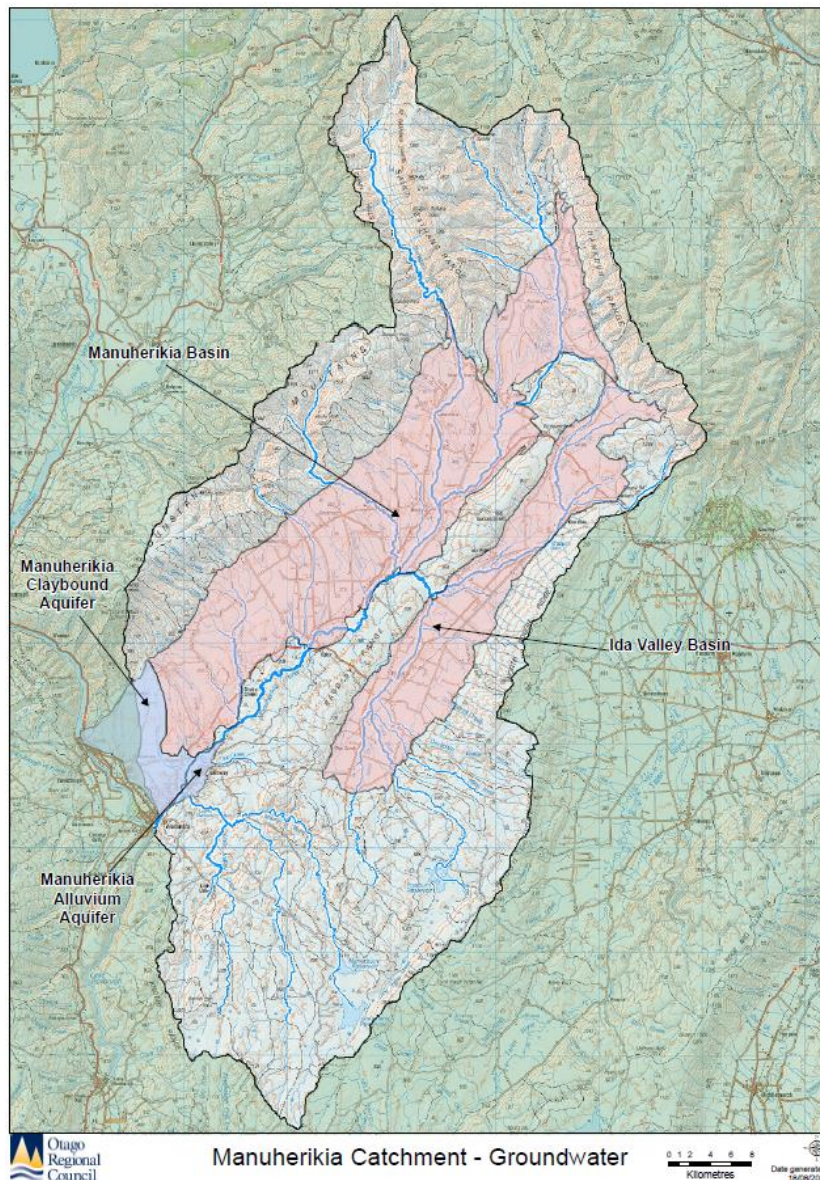
Flow sites that record the volume of water flowing in the Manuherikia River are located just below Falls Dam, at Ophir and at Campground, just outside of Alexandra. There is also a flow site on Dunstan Creek at Beattie Road. Actual and current flow information is available at these sites. MALF is calculated in other catchment locations using scientific estimates and modelling.

#### Summary of 7-d MALF (low-flow season) at key locations in the Manuherikia River and Dunstan Creek

Location	Flow data type	7-d MALF (m <sup>3</sup> /s)
Upper Manuherikia River downstream of Fork	Naturalised (gaps filled)	1.009
Manuherikia River at Falls Dam (downstream)	Naturalised	1.532
	Existing (current flows)	1.737
Manuherikia River at Blackstone Bridge	Naturalised	1.779
	Estimated “existing” (range)	1.513–1.947
Manuherikia River at Ophir	Modelled natural	3.200 (±0.6)
	Existing (current flows)	2.197
Manuherikia River at Campground	Modelled natural	3.900 (±0.8)
	Existing (current flows)	0.915
Dunstan Creek at Gorge	Natural (gaps filled)	0.692
Dunstan Creek at Loop Road Bridge	Naturalised	0.779
Dunstan Creek at Beattie Road	Naturalised	0.934
	Existing (current flows)	0.35



### 3.3.2 Groundwater



There are four aquifers within the catchment. The Manuherikia Basin Aquifer and the Ida Valley Basin Aquifer both contain groundwater that is not easily accessible due to the underlying geology which causes water to flow slowly. While there are only a handful of commercial takes, bores for domestic water are common. The groundwater is replenished from rain and snow melt. Groundwater from these areas is likely to flow into surface water streams and the main stem.

The water from the Manuherikia Claybound Aquifer is used for commercial purposes. This aquifer has reasonable flows with medium permeability in the rock and soil structure. Around 1/3 of the groundwater from this aquifer flows into the Manuherikia River via the alluvial aquifer, with the remainder flowing into the Dunstan Aquifer and contributing to the Clutha Mata-Au. The aquifer is recharged from rainfall, surface water from stream and irrigation water.

The Manuherikia Alluvial Aquifer is defined by the flood plain of the Manuherikia River between the exit of the Ophir Gorge and Alexandra, and is also used commercially. Inflows and outflows are closely tied to the Manuherikia River. The aquifer is recharged by the Manuherikia River, the Clay-bound Aquifer and low-efficiency irrigation.

There are also wetlands and salt pans in the catchment. Central Otago has more salt pans than anywhere else in New Zealand, with many in the Manuherikia. Eleven Regionally Significant Wetlands within the Manuherikia Catchment are mapped in the Water Plan. Kirkwoods Creek in the very north east of the catchment is the biggest wetland, and drains into the main stem above Falls Dam. The salt pans are located in the Ida and Manuherikia valleys and are largely amongst farmland.

### 3.4 Ecology

The Manuherikia catchment supports a diverse range of life, from invertebrates to native and sports fish and birdlife.

#### 3.4.1 Riparian and the wider environment

The catchment vegetation is dominated by pasture grasslands on the flat and gently sloping land. The higher mountain slopes support snow tussock. Tussock grassland on river and creek terraces and scrub (both native and introduced) covers about 3% of the catchment. Upstream of Falls Dam the Manuherikia River is braided. Further down the main stem riparian vegetation consists mainly of introduced species, including willows, grasses, and shrubs.

The streams, ponds and reservoirs that lie scattered throughout the catchment provide nesting and foraging habitat for a wide variety of birdlife. At least 19 different bird species can be found in the area, 16 of which are native. At risk species are:

- Banded dotterels / Tuturiwhatu – nationally vulnerable
- Wrybill / Ngutuparore – nationally vulnerable
- Black-fronted tern / Tarapirore – nationally endangered
- Pied stilt / Poaka – at risk, declining
- South Island oyster catcher / Tōrea – at risk, declining

The catchment vegetation supports a diverse invertebrate community including nationally endangered species endemic to New Zealand, as well as significant lizard species, including Scree Skinks (nationally vulnerable) and Green Skinks (at risk).

#### 3.4.2 In-stream values

Native fish species in the catchment include:

- Central Otago roundhead galaxias - nationally endangered
- Alpine galaxias (Manuherikia) – nationally endangered
- Clutha flathead galaxias – nationally critical
- Climbing galaxias / Koaro – at risk, declining
- Longfin eel / Tuna – at risk, declining
- Freshwater crayfish / Koura – at risk, declining
- Upland bully – not threatened
- Common bully – not threatened

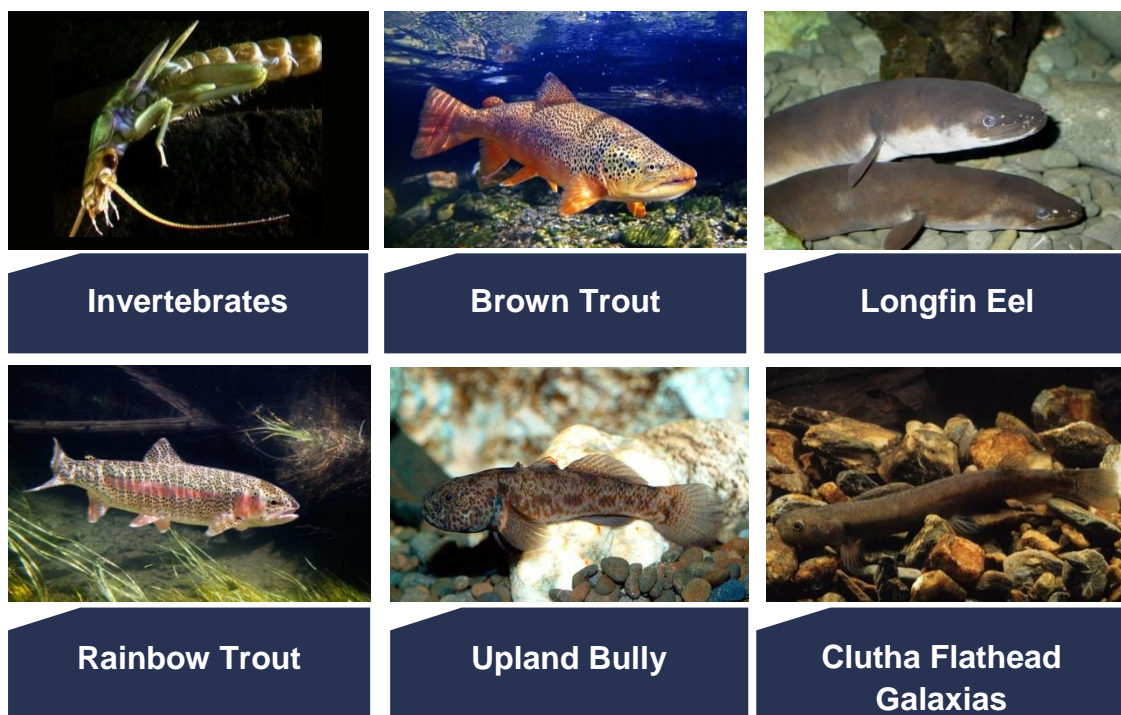
The Central Otago roundhead galaxias is nationally endangered due to its small habitat area of <100 hectares and predicted decline of 50-70%. There are historic records of the Central Otago roundhead galaxias in the main stem; however they are now only likely to persist in residual pockets in several tributaries within the catchment. 35 sub-populations are known.

The alpine galaxias (*Manuherikia*) is nationally endangered due to its small habitat area of ≤10 hectares and predicted decline of 10–50%. It has a single known population, located in the *Manuherikia* River above Falls Dam and in a couple of small headwater creeks.

The Clutha flathead galaxias is nationally critical due to numbers declining by up to 70%. It is confined to several isolated tributaries in the upper Pool Burn–Manor Burn area and has lost 20% of known sub-populations over the past decade. They have never been recorded in the main stem or any tributaries outside of the Pool Burn–Manor Burn area.

The catchment also contains four sports fish: Brown trout, Rainbow Trout, Brook Char and Perch. Both trout species exist throughout the catchment. Brook Char form populations in headwater streams. Perch are present in the Ida Burn below the Dam and may occupy other irrigation reservoirs too.

Fish and Game identify the Dunstan Creek, Upper *Manuherikia*, Manorburn and Poolburn Reservoirs, and Falls Dam as regionally significant back country areas.



### 3.4.3 Water quality

Based on a 2001 study, water quality ranges from excellent in the upper reaches of the *Manuherikia* and Ida Burn to good and fair in the middle to lower parts of the river and in the tributaries. Lower Thompsons Creek has poor water quality.



## 4. Social Context

### 4.1 Communities

Alexandra is the main population centre, with a stable population of 4,800. Smaller settlements in the catchment include Galloway, Omakau, Ophir, Chatto Creek, Lauder, Oturehua and St Bathans, as well as other small rural communities. There are many inter-generational families in the area, and people moving to the area for work, retirement and lifestyle opportunities.

95% of the population are European. There are 5% of the population that identify as Māori. 65% of the population are working age. The unemployment rate is a low 1.8% compared to almost 5% nationally. 80% of households in the area own their own homes.

### 4.2 Social values

The Manuherikia River and waters of the tributaries are highly valued for recreation and support a large range of activities such as fishing, kayaking, swimming, walking, biking, food gathering, picnicking, camping, hunting and curling. DOC administers many reserves in the catchment that are used for recreation including; Lauder Basin Conservation Area of around 9,000 hectares of high country and Dry Creek and Neinei i kura Conservation Areas, both in the Dunstan Mountains; the Blue Lake walks in Saint Bathans and Oteake Conversation Park covering a large area in the upper part of the catchment, Blackstone Hill Conservation Area, Waikerikeri Conservation Area, Fiddlers Flat and areas along the Manuherikia main stem.



**Recreation in the Manuherikia**

At the first round of consultation for the proposed plan change the public was asked to identify what they value about water in the catchment. Recreation was considered by many as important in the Manuherikia.

The catchment relies heavily on both surface water and groundwater for domestic and community water supplies.

## 5. Economic Context

### 5.1 Current local economy

There is a range of commercial activities within the Manuhierikia catchment including agriculture, horticulture, viticulture and tourism that rely on taking water, and the physical, historical and aesthetic qualities of the river.

#### 5.1.1 Agriculture, horticulture and viticulture

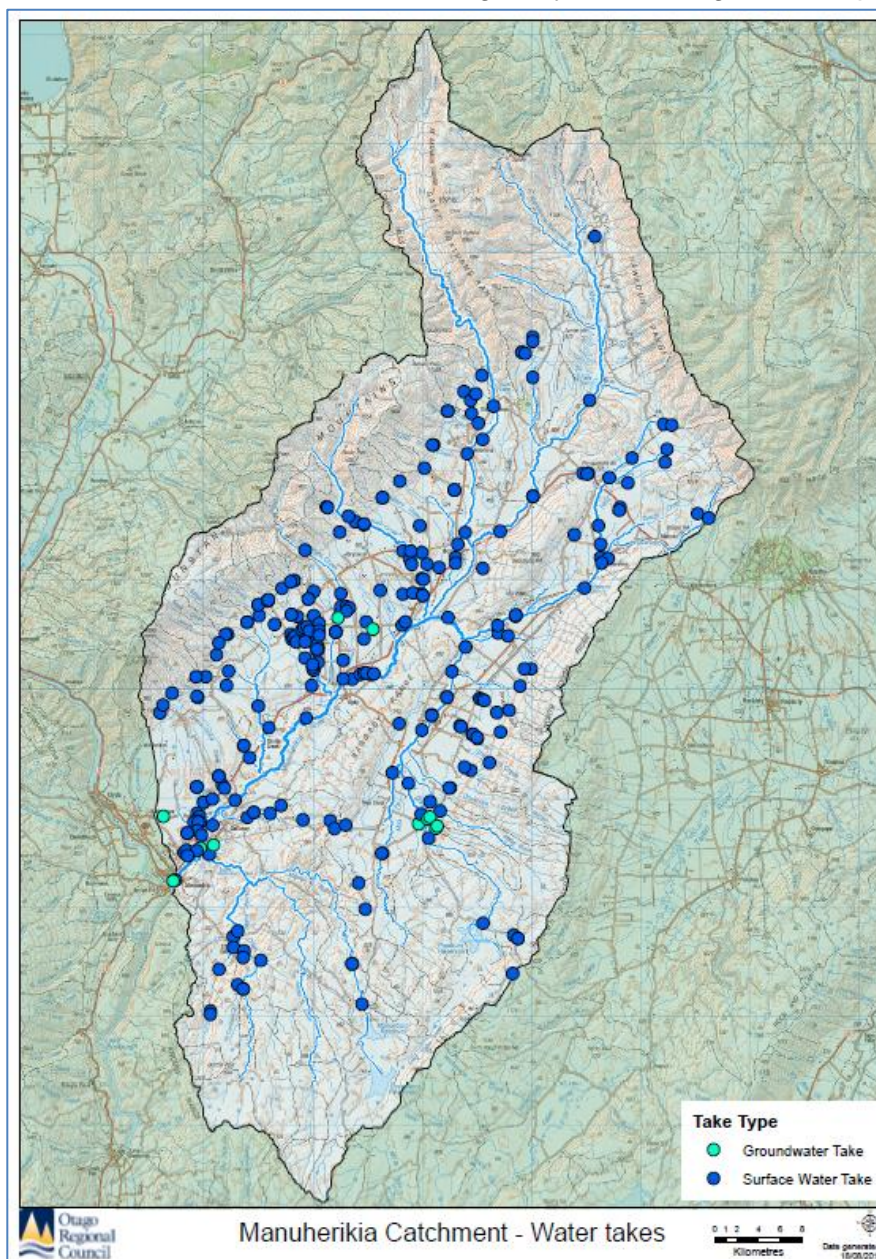
Large quantities of water are taken in the Manuhierikia Catchment. Council records currently show over 220 consented surface water takes. In addition to this, there are also a number of groundwater takes (13 consented), most of which are exercised from the Manuhierikia Alluvium and Manuhierikia Claybound aquifers.

The majority of the water taken in the Manuhierikia is for irrigation, most of it for pasture production. Currently 25,000 hectares are irrigated (15,000 fully and a further 10,000 hectares occasionally, due to water scarcity).

Some of the water takes are managed by the six irrigation companies that operate to provide

water to their customers via water races; Blackstone, Hawkdun / Idaburn, Poolburn, Omakau, Manuhierikia and Galloway. There are also private water takes operated by individuals.

There are six major irrigation schemes in the Manuhierikia catchment irrigating an area of approximately 22,000 hectares. These irrigation schemes are largely reliant on gravity-fed and manually controlled open races for transporting water. Historically, the irrigation water has been applied using overland flow systems such as flood and border dyke irrigation. In recent years, more efficient spray irrigation systems such as centre pivot and K-line have become more common.





### 5.1.2 Tourism

Tourism within the catchment has grown significantly over the last decade providing local businesses boosted opportunities. Tourism is based predominantly on the visual uniqueness and aesthetics of the landscape and its rich heritage. This supports trout fishing (including guided fishing), off-road vehicle use, tramping, camping, biking, (including the Otago Central Rail Trail), and vineyards.

### 5.2 Changes in the way land is used

Traditional land use in the area has been dominated by sheep and beef farming. In the past decade the catchment has experienced an increase in the number of dairy conversions. The same period has also seen the establishment of extensive vineyards, lifestyle block development and residential intensification, particularly north and east of Alexandra in the lower catchment.

## 6. Cultural Context

### 6.1 Local iwi

Kāi Tahu are takata whenua of the Otago region. Water is significant in the spiritual beliefs and cultural traditions of Kāi Tahu. The health of water bodies and the condition of water is of particular consideration. Schedule 1D of the Water Plan identifies the spiritual or cultural beliefs, values or uses associated with water bodies of significance to Kāi Tahu. Those that relate to the Manuherikia River and various non-specified tributaries are:

Kaitiakitanga – the exercise of guardianship by Kāi Tahu in accordance with tikanga Māori; this includes the ethic of stewardship.

Mauri – life force; for example the mauri of a river is most recognisable when there is abundance of water flow and the associated ecosystems are healthy and plentiful.

Waahi tapu and/or Waiwhakaheke – sacred places; sites, areas and values associated with water bodies that hold spiritual values of importance.

Waahi taoka – treasured resources: values, site and resources that are valued and reinforce the special relationship Kāi Tahu have with Otago's water resources.

Mahika kai – places where food is procured or produced. e.g. Whitebait and koura.

Kōhanga – important nursery/spawning areas for native fish and/or breeding grounds for birds.

Trails – sites and water bodies which formed part of traditional routes, including tauraka waka (landing place for canoes).

Cultural materials – water bodies that are sources of traditional weaving materials. e.g. raupo, paru and rongoa (medicines).

The Water Plan identifies Little Bremner Creek, a tributary of the East Branch, and Moa Creek, a tributary of the Poolburn, as streams with Waahi taoka values.

Council also takes into account the values identified in the Kai Tahu Ki Otago Natural Resource Management Plan 2005 in any policy or plan change. Section 5.3 of the plan on Wai Māori contains issues, objectives and policies regarding the need to provide minimum flows that protect cultural values and other social, cultural and biological needs.

## 7. Related Documents

List of all documents informing the plan change to date:

- Management flows for aquatic ecosystems in the Manuherikia River and Dunstan Creek (Sept 2016)
- Instream values and water resource management options for the Ida Burn (Oct 2012)
- Alexandra Groundwater Basin Allocation Study (Sept 2012)
- Groundwater Exploration in the Ida Valley (March 2012)
- Manuherikia water resources summary (2009)
- Management Flows for Aquatic Ecosystems in the Manuherikia River (Aug 2006)
- Groundwater Allocation of the Alexandra Basin (Oct 2005)
- Waterways Research: Qualitative and Quantitative Findings (Versus Research for ORC, Dec 2016)