POMAHAKA CATCHMENT

Information sheet
May 2014

Otago Regional Council

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LOCATION

The Pomahaka catchment is located in southwest Otago and is one of the larger catchment tributaries of the Clutha River/Mata-Au (Figure 1). Their confluence is about 20 km upstream of Balclutha.

The river flows in a southwest direction from its headwaters in the Umbrella Range, through productive farmland around Tapanui and Heriot, to join the Clutha River/Mata-Au near Clydevale. The river extends for approximately 98 km and has a catchment area of approximately 2,060 km^2.

The Waipahi River is a significant tributary of the Pomahaka, covering the southwest corner of the catchment and partly extending into the Southland region.

Tributaries such as the Waikoikoi and Washpool Streams, Pattersons, Timber, Bullock and Green Creeks and Whiskey Gully also play a large part in the life-sustaining capacity of the Pomahaka River.

The name Pomahaka is thought to be from 'Poumahaka' meaning posts driven into a river's banks, to snare ducks.

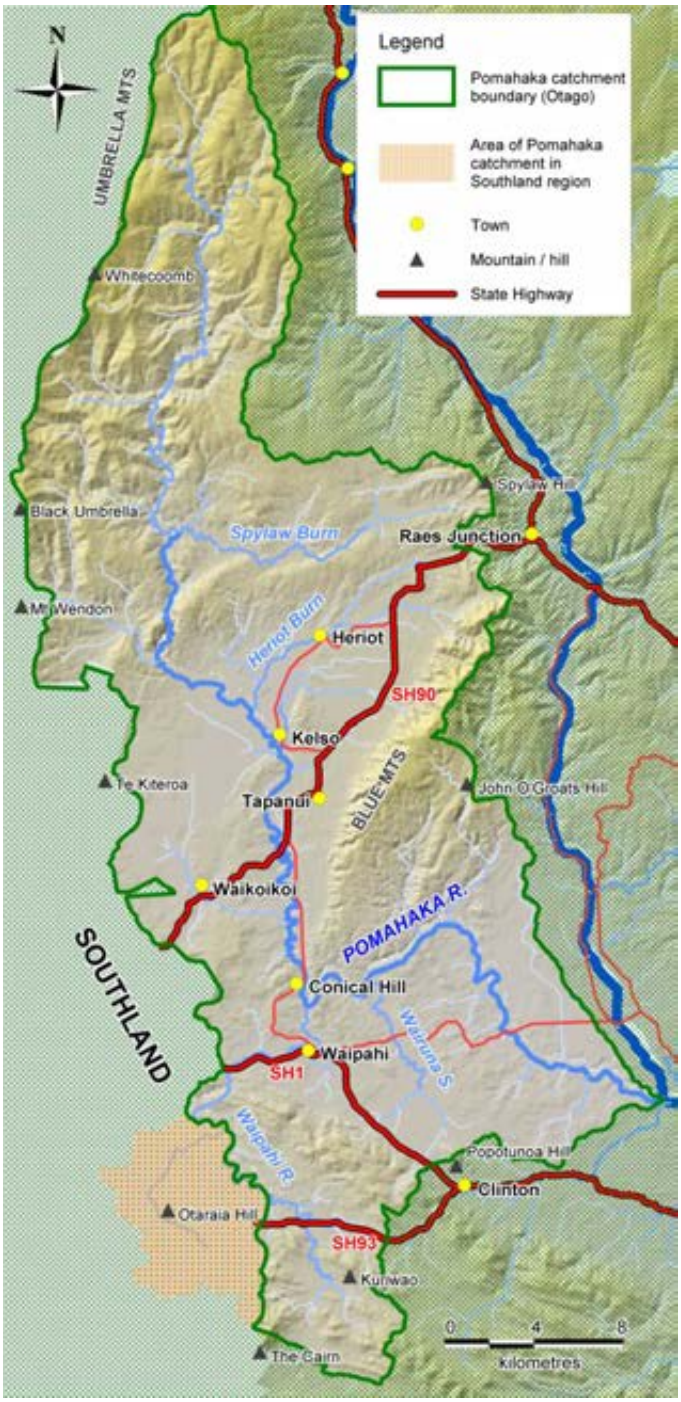

Figure 1. Map of Pomahaka catchment.

NATURAL VALUES

Topography and soils

The upper Pomahaka catchment is bounded by the Umbrella Mountains to the north and the Blue Mountains in the east while the land to the south and west is predominantly undulating country. The catchment is dominated by yellow-grey and yellow-brown earths. The soils, especially those on the river flats and terraces, are of high fertility.

Rainfall

The catchment has relatively high, consistent rainfall throughout the year. The lower parts of the catchment receive an average of 700 mm/year, while the upper parts of the catchment, including the mountain ranges, receive approximately 1400 mm/year (ORC data). Rainfall varies throughout the catchment due to factors such as altitude, aspect, topography and seasonality.

Hydrology and river flow data

The upper Pomahaka River flows through a series of gorges containing bedrock riffles and gravel pools while the lower Pomahaka River flows through developed farmland across a bed of coarse gravel and large cobbles and some areas of bedrock.

Information from the flow recorder sites in the Waipahi and upper and lower Pomahaka sites gives a detailed indication of the range of river flows within the catchment, as shown in Figure 2.

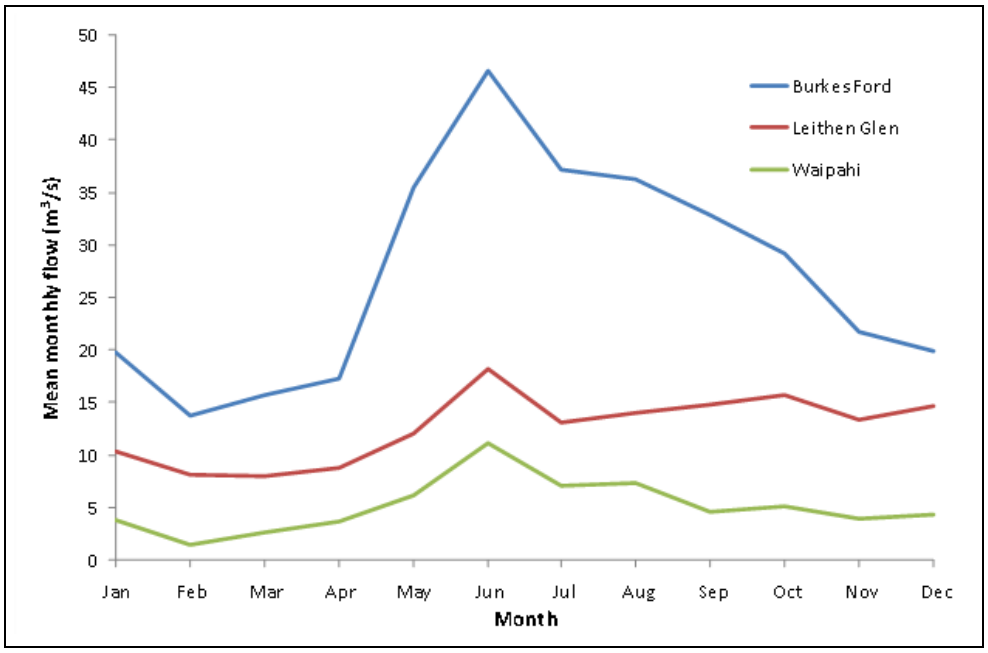

Figure 2. Mean monthly flows for monitoring sites in the Pomahaka catchment.

River flows are highest throughout the catchment from May to September, corresponding with higher rainfall. Winter snowfalls lead to snowmelt and flows are consistently high in the upper Pomahaka (Leithen Glen) during spring. The lowest recorded flows throughout the catchment have all occurred in the mid summer/early autumn period (January to April).

The hydrological statistics of the Pomahaka catchment are outlined in Table 1. Mean annual low flow (MALF)[1] is shown, which is a progressively higher figure at lower points in the catchment, as it is based on the area of the catchment upstream.

Site	Location	Catchment area (km^2)	Term of record (yrs)	Lowest recorded flow (l/s)	Mean recorded flow (l/s)	Max. recorded flow (l/s)	MALF (l/s)
Leithen Glen	Upper Pomahaka	711	23	830	12400	47700	2000
Burkes Ford	Lower Pomahaka	1,924	55	920	26800	115700	4300
Waipahi	Waipahi	300	19	170	5100	34200	600

Table 1. Hydrological Statistics of Pomahaka catchment Flow Sites.

Flooding

A number of floods have occurred in the Pomahaka catchment. The three largest floods recorded at Burkes Ford (since permanent monitoring began in 1961), include January 1980 (115,700 l/s); October 1978 (111,300 l/s); and September 1972 (96,000 l/s).

Water Quality

ORC undertakes State of the Environment (SOE) water quality monitoring. The monitoring looks at a number of important parameters such as the concentration of bacteria (*E. coli)*, turbidity and various nutrients. The monitoring results (80^{th} percentile below median flow 2008 to 2013) were analysed against Water Plan Schedule 15 limits and targets (introduced by Plan Change 6A) to classify water quality at each site into one of four categories (excellent, good, fair and poor).

Leithen Glen was classified as 'excellent' as no PC6A limits were exceeded. The Waikoikoi and lower Waipahi had 'good' water quality, Burkes Ford had 'fair' water quality, but the upper Waipahi, Heriot Burn, Crookston Burn and Wairuna Stream all had 'poor' water quality.

Trend analysis of water quality data from 2006 to 2011 (ORC, 2012) showed an increase in total nitrogen in the Crookston Burn and the lower Waipahi, these catchments have undergone recent change

[1] MALF is the average of the lowest flows observed for any seven-day period, for each year recorded. If records of flows are not available or are less than adequate, MALF can be estimated by other methods which take account of precipitation and catchment area. MALF is used in Otago's Water Plan for setting allocation limits.

to more intensive farming. As land use intensifies, particularly with the introduction of dairy farming, there tends to be a significant increase of nitrogen contamination in water. The longer-term trend analysis (2001-2011) identified tributaries of the Pomahaka as some of the lowest quality water in Otago (ORC, 2012).

As with any river, the water quality in the Pomahaka River can be adversely affected by heavy rainfall and flood flows, elevating bacteria, suspended solid and nutrient concentrations.

Significant Wetlands

The Water Plan Schedule 9 Regionally Significant Wetlands (RSWs), lists eight wetlands which are wholly or partly in the Pomahaka catchment. These are below 800 metres above sea level:

RSWs in the Pomahaka catchment:

- Clifton Hill Marshes
- John O'Groats Hill Fen
- Pomahaka River Oxbow Marsh (Koi Creek)
- Pomahaka River Oxbow Marsh (Dalvey School Road)
- Macfarlane Road Oxbow Swamp
- Willowburn Bog
- Dunvegan Fen Complex
- Cairn Road Bog

Any wetland located above 800 m altitude is also a Regionally Significant Wetland, but is not specifically identified.

All these wetlands, and many others which are not identified within the Water Plan, are an important part of the hydrological functioning within the catchment and help to control downstream flood peaks and low flows. Wetlands act to filter water passing through them while providing habitat for a diverse range of birds, invertebrates and aquatic life.

Catchment ecology

Fish

There are ten species of fish (four introduced and six native species) and one species of freshwater crayfish present within the catchment. The introduced species include brown trout (*Salmo trutta*), chinook salmon *(Oncorhynchus tshawytscha)*, rainbow trout *(Oncorhynchus mykiss)*, and perch (*Perca fluviatilis)*.

Native species include non-migratory galaxiids, common bully (*Gobiomorphus cotidianus*), upland bully (*G. breviceps*), lamprey (*Geotria australis*), longfin eel (*Anguilla dieffenbachii*), shortfin eel (*A. australis*), and crayfish (*Paranephrops sp*.). Longfin eels, lamprey, and galaxiids sp. are threatened species.

Brown trout are the most common species within the catchment. Freshwater mussels (*Hyridella menziesi*) were once abundant in the Pomahaka River but are now uncommon.

Flora

Snow tussock, among remnant pockets of beech forest, dominates the upper catchment area while the mid and lower reaches of the catchment are dominated by pastoral grasses.

Areas of remnant flax and Carex sedge vegetation remain in channels and side creek areas and native water milfoil (*Myriophylum sibericum)* in the main stem of the river.

Within the riparian areas, populations of endangered tree daisies, including *Olearia hectorii* and *O. fimbriata*, are found within the Pomahaka catchment. Classified as nationally vulnerable, one of the largest populations of *O. fimbriata* is found at McKay Creek, with 5,000 adult plants and 500 seedlings known (DoC factsheet). Also found is a new species *Olearia n.sp.*'*Pomahaka*' which has been named after the Pomahaka catchment which is its centre of dispersal.

Other species found within the riparian community are mingimingi (*Coprosma propinqua*), korokio (*Corokia cotoneaster*), broom (*Carmichaelia petriei*), bush lawyer (*Rubus cissoides*), and lancewood/horoeka (*Pseudopanax crassifolius*) (LINZ, 2002).

Weeds such as gorse, broom, and willows are also present, frequently blocking access to the river.

Invertebrates

The Pomahaka River and some tributaries contain rare invertebrates, as outlined in Schedule 1A of the Water Plan.

The upper catchment contains habitat where the giant land snail, which is classified as in serious decline, has been found (LINZ, 2002).

Tree daisies also support large moth biodiversities endemic to New Zealand. Rare moths present in *Olearia hectorii* and *O. fimbriata* found within the Pomahaka catchment include *Protosynaema* sp. 'olearia' (nationally endangered), *Pyrgotis* sp. 'olearia' (range restricted), *Meterana grandiose* (gradual decline), and *M. exquisite* (gradual decline) (LINZ, 2002).

Birds

A diverse range of bird life has been observed including mallard, grey duck, paradise shelduck, New Zealand shoveler, pukeko and Canada geese. The threatened mohua is found in relatively high numbers in the Blue Mountains. In addition the Blue Mountains have very good numbers of other native forest birds such as falcon, bellbird, kereru, grey warbler, rifleman, fantail and shining cuckoo.

Figure 3. Pomahaka River - view downstream from Leithen Glen

Schedule 1A natural values

The Water Plan's Schedule 1A includes the ecosystem values attached to the Pomahaka River. The character of the river and its margins, and the amenity values supported by the river are important natural values.

The areas identified in Schedule 1A are:

Pomahaka River	*Ecosystem values* Provides access unimpeded by artificial means such as weirs and culverts; large water body supporting species and habitat variety providing for diverse life cycle requirements of particular or range of species. Gravel, sand, and silt bed composition of importance for resident biota, free of aquatic pest plants, riparian vegetation of significance to aquatic habitat, regionally significant presence of trout, significant habitat for trout and salmon spawning and juveniles; significant presence of eel, presence of significant range of indigenous fish and invertebrate species, presence of rare invertebrate species.
Bullock Creek	*Ecosystem values* Free of aquatic pest plants and presence of rare invertebrate species.
Whiskey Gully	*Ecosystem values* Free of aquatic pest plants and presence of rare invertebrate species.
Rankleburn	*Ecosystem values* Free of aquatic pest plants and presence of rare invertebrate species.
Timber Creek	*Ecosystem values* Provides access unimpeded by artificial means such as weirs and culverts, free of aquatic pest plants and presence of rare invertebrate species.
Back Stream West Branch	*Ecosystem values* Free of aquatic pest plants and significant range of invertebrate species.
Waipahi River	*Ecosystem values* Large water body supporting species and habitat variety providing for diverse life cycle requirements of particular or range of species, gravel bed composition and macrophytes important for resident biota, free of aquatic pest plants.

COMMERCIAL, SOCIAL AND CULTURAL VALUES

Land use

Land use within the catchment is primarily extensive sheep and beef farming. The mid and lower reaches of the catchment are dominated by high intensity farming, with smaller farms and higher stocking rates relative to the upper catchment.

There has been a marked increase in the number of dairy farm conversions in the catchment over recent years. There are also extensive areas of production forestry within the catchment particularly around Dusky Forest, Conical Hill and the Blue Mountains.

Commercial values

There are a number of commercial ventures within the Pomahaka catchment which rely on the physical, historical and aesthetic qualities of the river.

Tapanui is a service town for the surrounding productive agricultural land and forestry. Sheep and dairying are the major agricultural activities in the surrounding area.

Timber production and processing is also an important industry to the area. Tourism in the area is driven by hunting available in the Blue Mountains, and angling on the Pomahaka River, with fishing guides and a range of accommodation available as well as restaurants and bars.

Floriculture (flower farming) and gravel extraction are also important industries. There is the potential for possible coal mining in the catchment.

Historical values

There are a number of historic sites identified in the catchment:

The Pomahaka River Trail follows a number of historic sites along the river, including the Kelso flood monument which commemorates the town's destruction by the 1980 flood.

Leithen Glen, New Zealand's first forestry camp established in 1898, is situated on the banks of the Pomahaka River and is now a picnic area.

A number of historic gold mining sites are found along the Pomahaka River, where European and Chinese miners mined alluvial gold from the headwaters at Old Man Range down to Devils Gorge. Wing dam remnants are present in the bed of the river.

The 'burning plains' is a seam of lignite coal in the Pomahaka catchment which was first reported to be burning by early Maori and is still burning today.

Recreational values

The Pomahaka River is generally a safe river for recreation. The predominant recreational uses within the catchment include:

- Angling (trout and perch)
- Game bird hunting (predominantly downstream from Tapanui) of mallard, grey duck, paradise shelduck, NZ shoveler, pukeko and Canada geese
- Pig and fallow deer hunting
- Kayaking, rafting and swimming
- Walking and tramping
- Photography and art
- Camping
- Mountain biking
- BBQ's and picnicking.

Sunday drives, driving from bridge to bridge along the river, were once a popular pastime.

The Pomahaka River is recognised as one of the more popular trout fisheries in Otago, with both riverine and sea-run Brown Trout. The Pomahaka River and its tributaries have substrate important for trout spawning, and

habitat for juvenile trout. The National Angler Survey estimated 4,140 angler days were spent on the Pomahaka in the 2007/08 season (NIWA, 2009).

Iwi values

Water occupies a significant role in the spiritual beliefs and cultural traditions of iwi, and the health of water bodies and the condition of water is of particular importance. The Pomahaka River is a Statutory Acknowledgement area under the Ngai Tahu Claims Settlement Act 1998 (Schedule 52), providing for the special association of Ngati Mamoe and Ngai Tahu kainga (settlements) in the Catlins and Tautuku areas, with the river. It is an important river for mahika kai, especially for its kanakana (lamprey) fishery, but also associated with weka and other manu (birds). This Statutory Acknowledgement does not include any tributary flowing into the river.

The Kai Tahu ki Otago Natural Resources Management Plan and Schedule 1D of the Water Plan identify the significance of the Pomahaka River. Those values that are specific to the Pomahaka and Waipahi Rivers are:

Kaitiakitanga – the exercise of guardianship by Kai Tahu in accordance with tikanga Maori in relation to Otago's natural and physical resources; and includes the ethic of stewardship.

Mauri – life force; e.g. the mauri of a river is most recognisable when there is abundance of water flow and the associated ecosystems are healthy and plentiful; a most important element in the relationship that Kai Tahu have with the water bodies.

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

Figure 4. Cultural values

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

Mahika kai – places where food is procured or produced. Examples of waterborne mahika kai include eels, whitebait, kanakana (lamprey), kokopu (galaxiid species), koura (freshwater crayfish), freshwater mussels, indigenous waterfowl, watercress and raupo.

Kohanga – important nursery/spawning areas for native fisheries 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 (such as raupo and paru) and rongoa (medicines).

The Pomahaka River is also listed in the Ngāi Tahu ki Murihiku Natural Resource and Environmental Iwi Management Plan 2008 as a major river catchment to which Ngāi Tahu ki Murihiku have significant cultural associations.

WATER TAKES WITHIN THE CATCHMENT

Permitted surface water takes

Under the Resource Management Act (RMA) and the Water Plan, water can be taken from the Pomahaka River and its tributaries for an individual's reasonable household and animals' drinking water needs, and for fire-fighting purposes. The Water Plan permits smaller water takes subject to meeting the standards specified. The ORC does not hold information on water taken under permitted activity rules.

Consented surface water takes

In the Pomahaka catchment there are currently 26 surface water permits totalling 1,060 l/s from the Pomahaka River and its tributaries, as well as a further four water applications that are currently being processed (totalling 317 l/s). Figure 5 shows the location of current surface water takes and those under application. When combined with consents currently being processed, this accounts for 64% of the default primary allocation available in the Pomahaka catchment, in accordance with Policy 6.4.2b(i) in the Water Plan. Primary allocation in the Pomahaka River is currently set by default at 50% of the MALF (2,150 l/s). Table 2 outlines the April 2014 allocation situation in the catchment with 773 l/s primary allocation available in the Pomahaka catchment.

Water take	Number of consents	Combined instantaneous take rate (l/s)	Purpose	Water source
Current surface water permit	26	1060	Irrigation, stock water and dairy shed, timber mill supply & rural water supply scheme, crayfish farm	Pomahaka River, Pattersons Creek, Green Creek, Whiskey Gully Creek, Timber Creek, Heriot Burn, Waipahi River, Boggy Creek, Flodden Creek
Water permit applications being processed	4	317	Irrigation, stock water and dairy shed	
Total takes	30	1377		

Table 2. Surface water takes within the Pomahaka catchment as of April 2014.

Of the 26 surface water take permits, Schedule 1B of the Water Plan lists four as active community water supplies: Glenkenich, Moa Flat, Tapanui, and Green Creek rural water supply. These are not subject to minimum flow restrictions.

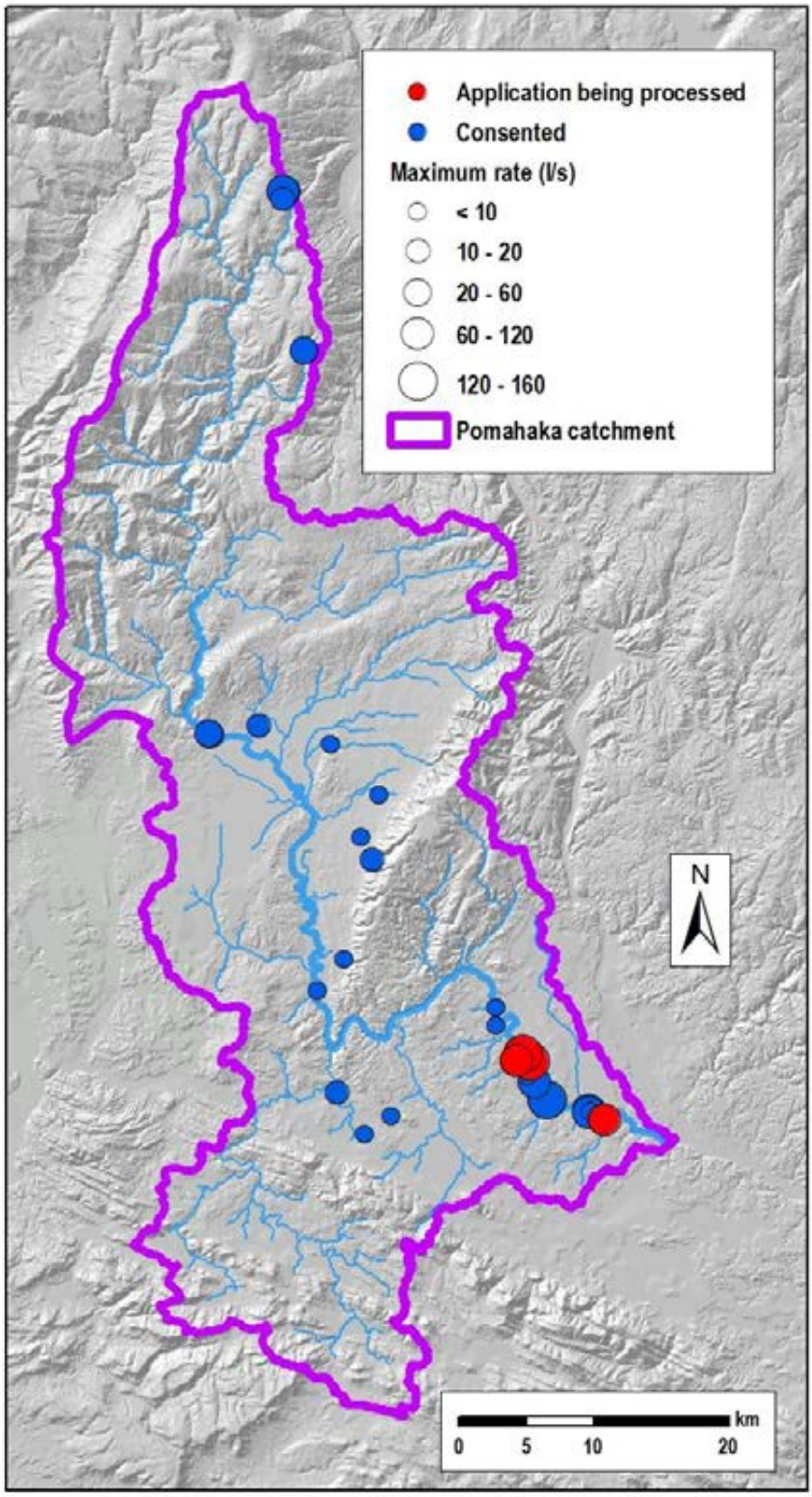

Figure 5. Water takes within the Pomahaka catchment.

Consented groundwater takes

Following 2012's Plan Change 1C (Water Allocation and Use) to the Water Plan, groundwater takes from within 100 m of a connected perennial surface water body are managed as surface water, subject to the surface water allocation regime, and any minimum flow. There are currently few if any consented groundwater takes within this 100 m boundary. In addition, under Plan Change 1C, groundwater takes more than 100 m from any connected perennial surface water body that depletes flows by more than 5 l/s, are considered partly subject to the surface water allocation regime.

There are currently 19 consented groundwater takes within the Pomahaka catchment, of which 5 are known to be situated in alluvium and are considered to be effectively taking surface water. These are located within 'alluvial ribbon aquifers' as shown in Figure 6, which are proposed to be identified formally by Council.

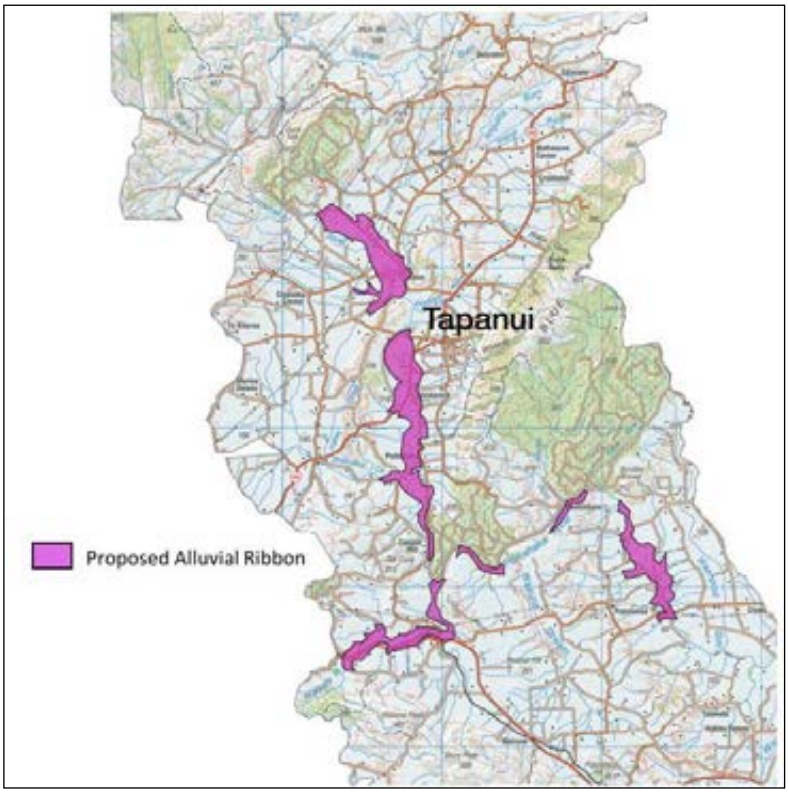

Figure 6. Alluvial ribbon aquifers in the Pomahaka catchment.

FURTHER INFORMATION

Otago Regional Council (2004)	Regional Plan: Water.
Otago Regional Council (2006)	Management Flows for Aquatic Ecosystems in the Pomahaka River.
Otago Regional Council (2006)	The Water Resources of the Pomahaka and Waiwera Rivers.
Otago Regional Council (2012)	State of the Environment Surface Water Quality in Otago.
Department of Conservation	*Olearia fimbriata* Small-leaved tree daisy fact sheet
NIWA (2009)	Angler usage of lake and river fisheries managed by Fish & Game New Zealand: results from the 2007/08 National Angling Survey.
Land Information New Zealand (2002)	Conservation Resources Report. Gem Lake Crown Pastoral Land Tenure Review. *and* Conservation Resources Report. Hukarere Crown Pastoral Land Tenure Review.

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