



Trotters Creek Catchment

March 2008

Information Sheet - Draft

Overview

Trotters Creek is a small east coast stream located in North Otago. With a catchment of approximately 32 km² which drains the Horse Range, the river runs for approximately 12 km and joins the Pacific Ocean at Katiki Beach, south of Moeraki.

Upper Trotters Creek travels through the limestone Trotters Gorge, well known for its spectacular cliffs and outcrops, and flanked with native bush. The lower Trotters Creek flows through relatively flat, predominantly pastoral, land. The river runs with large slow, deep pools combined with shallow riffles.

Trotters Creek is a healthy river, which has a range of values for not only those who live locally but also those who are visitors to the area.



Map 1. Trotters Creek Catchment

Natural Values

Topography and soils

Soils identified within the Trotters Creek catchment are predominantly sandstone breccia-conglomerate. Thin soils overlie the many rock formations namely yellow grey to yellow brown earth intergrade (Kakahu hill) and lowland yellow-brown earths (Taratu and Hurunui hill). The catchment has good drainage and medium natural fertility. Trotters Creek and associated gorge is well known for the number of visible geological features, dramatic limestone formations, cliffs and bluffs, sandstone canyons and weathered outcrops.

The upper Trotters Gorge soils are protected from erosion by the native vegetation present. However, steep slopes with little vegetation are susceptible to erosion especially during heavy rain.

Rainfall

Rainfall information recorded between 1908 and 1996 indicates an average annual rainfall of 628 mm/yr dependent on topography and distance from the coast.

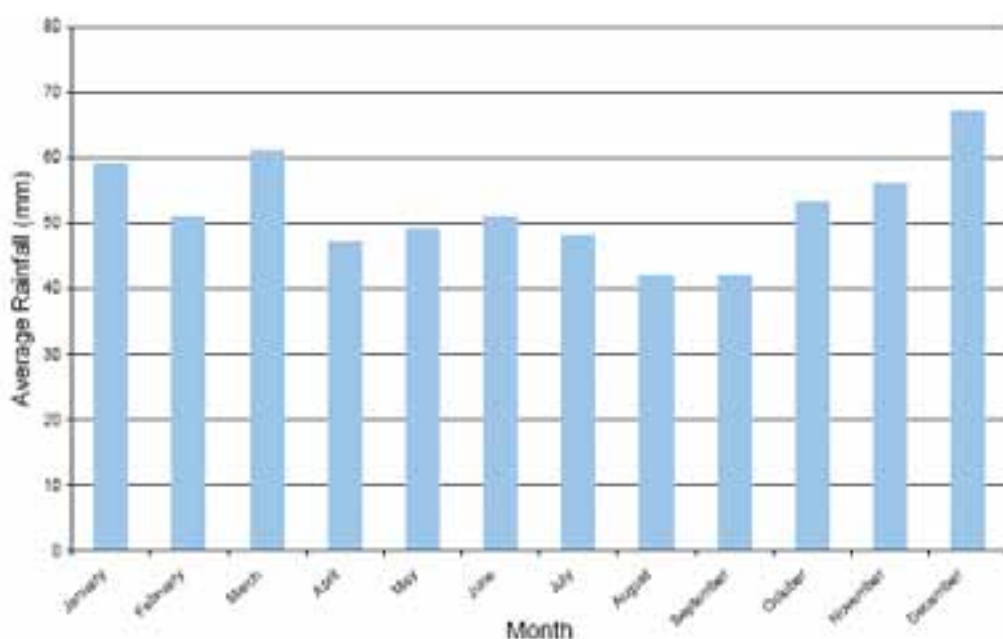


Figure 1: Mean monthly rainfall for the Trotters Creek Catchment (1908-96)

Historical river flow data

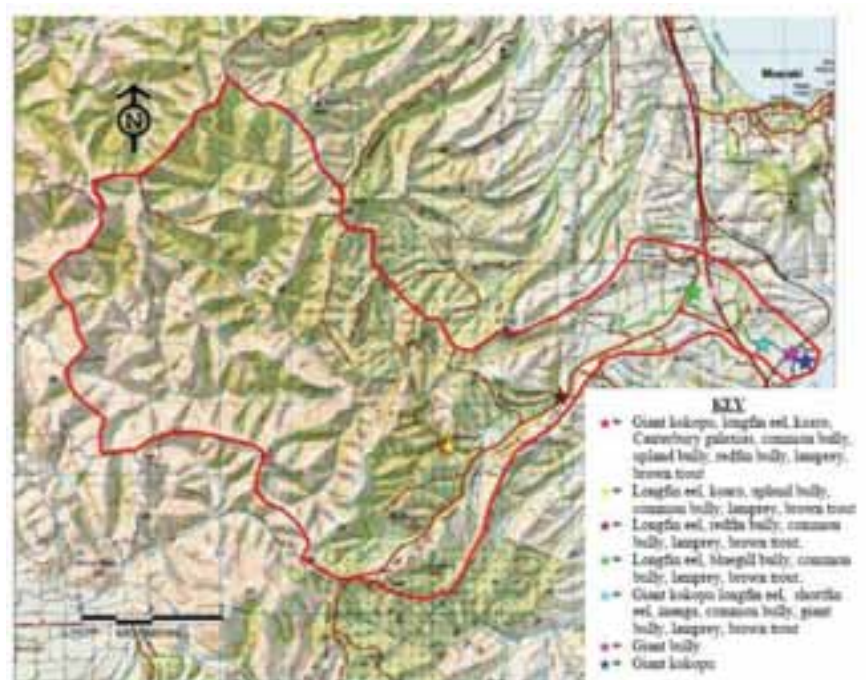
It must be noted that there is no permanent flow recorder in the Trotters Creek Catchment and therefore there are limited flow gauging data. As Trotters Creek has a similar topography and receives similar rainfall to the Waianakarua South Branch (growOtago data), the Waianakarua information has been assimilated with the limited number of Trotters Creek gaugings to create flow data for the Trotters Creek.

Catchment ecology

- The main stem of the river is currently believed to be free of aquatic pest plants.
- Riparian vegetation along the river creates aquatic habitats for a diverse fishery which includes 13 different species of which 12 are native - giant kokopu, longfin eel, Canterbury galaxias (species of main Department of Conservation conservation value), koaro, shortfin eel, inanga, common bully, upland bully, redfin bully, bluegill bully, giant bully, brown trout
- Presence of indigenous fish species threatened with extinction – lamprey
- The lower section of the river experiences seasonal runs of sea trout which are targeted by some anglers, with fish up to 3kg sometimes landed
- High degree of naturalness above the afforested areas of the catchment
- Rare invertebrates present upstream – including *Asaphodes stinana* (moth) and *Flammocharopa "giant pilsbryi"* (snail)
- Original vegetation includes snow tussock, manuka and native bush. The native plant population has been modified with introduced plants; clearance and over-sowing of introduced pasture grasses. Podocarp forest in the damp gullies contains kanuka, broadleaf, kowhai while small areas of tussock remain on the tops of the range
- Native forest within the catchment contains a range of native flora and fauna including the large mountain daisy (*Celmisia hookerii*), Karearea (New Zealand falcon), Pipipi (brown creeper), Riroriro (grey warbler), Korimako (bellbird), Tui, Kereru (New Zealand pigeon), Matata (fernbird) and Kakariki (parakeet)
- The catchment includes important brood rearing and adult habitats for mallard ducks (Pringle 2005).

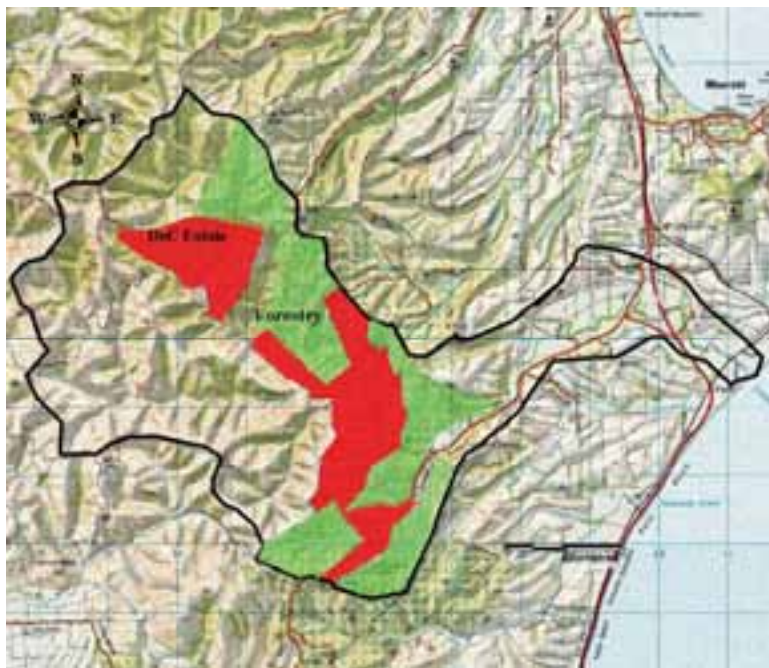
Other natural values

The natural character of the river and its margins, and the amenity values supported by the river. Clear, high quality water adds to the aesthetic appeal of the stream and reserve areas.



Map 2. Fish distribution of the Trotters Creek Catchment from the NIWA freshwater fish database and Otago Regional Council survey

Economic, Social and Cultural Values



Land use

Map 3. Land use within the Trotters Creek catchment

Current land use within the catchment includes 640 ha of forestry, pastoral sheep and beef farming, and 490 ha of Department of Conservation estate which incorporates Trotters Gorge Scenic Reserve (142 ha of regenerating native bush).

Commercial values

A significant component of the local economy is derived from the river itself and surrounding land. Trotters Creek catchment provides for commercial ventures ranging from accommodation to agriculture and tourism. These include:

- Trotters Gorge Scenic Reserve hut
- farming
- forestry
- holiday homes
- home stays
- guided tours

Consented surface water takes



Map 4. Consented surface water takes

As at February 2008 there are two consented consumptive surface water takes, one primary and one supplementary allocation, within the Trotters Creek catchment. The river as a water source has a current overall consented water take of approximately 0.01 m³/s (primary allocation), and 0.006 m³/s (supplementary allocation). These consented takes are shown in Map 4 above.

Water may also be taken under the permitted activities of the Regional Plan: Water, but the Otago Regional Council would have little or no information about these.

Historical values

Historically Trotters Creek is of local, regional and national importance with its long connection with Maori culture, as well as European settlement.

Kai Tahu values

The Trotters Creek has the following values significant to iwi:

- Kaitiakitanga: the exercise of guardianship by Kai tahu;
- Mauri: life force; and
- Waahi taoka: treasured resource; values, sites and resources that are valued.

Trotters Creek has the following access/customary use interests to iwi:

- Mahika kai: places where food is procured or produced;
- 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); and
- Waipuna: sources of water highly regarded for their purity, healing and health-giving powers.

Recreational / Human use values

Trotters Creek and associated catchment represent a highly valued recreational resource for a wide range of people. The river's size, health and attractiveness support a wide variety of formal and informal recreational activities. The river adds to the serenity of the area lived in and walked in, and valued by locals and guests alike. Some of the recreational activities occurring within the catchment include:

- fishing – sea trout
- whitebaiting
- swimming and informal water play – there are a number of pools used by locals and visitors
- picnicking at the reserve
- camping
- bird watching
- photography
- bush walking / tramping
- hunting (especially goats and pigs)
- informal recreation

Trotters Gorge Scenic Reserve

First created in 1864 Trotters Gorge Scenic Reserve (152 ha) is located at the southern end of the Horse Range and accessed via Horse Range Road. The Department of Conservation-owned reserve is a fragment of indigenous bush providing protection for a range of native flora and fauna as well as being a well known recreational spot.

The reserve is considered to be of local, regional and national importance containing an array of features of botanical, geographical, and entomological interest. A number of unique plant and invertebrate species associations exist within the reserve.

Towards Setting a Minimum Flow

A suggested management flow for aquatic ecosystems

The ORC completed a study of the management flows for aquatic ecosystems in Trotters Creek in 2006. The purpose of the report was to investigate the flows required to maintain acceptable habitat for the fish species found in Trotters Creek. It focused on the river's natural values, identified in Schedule 1A of the Regional Plan: Water for Otago. In its conclusion, the report suggested seasonal management flows of 0.02 m³/s and 0.035 m³/s for aquatic ecosystems.

Flow statistics such as the 7-day mean annual low flow (MALF) and 7-day 10 year low flow (Q710) were calculated to give an indication of the low flows experienced by that part of the catchment. Rainfall information was also summarised to give an indication of annual rainfall and seasonal distributions.

Biodiversity and recreational information was obtained from both the Department of Conservation and Fish and Game Otago. This information was incorporated into the report along with fisheries and climate data collected by Otago Regional Council. Instream habitat surveys were carried out in Trotters Creek and flow requirements for all the known resident fish species assessed by examining the relationships between flow and suitable habitat using instream habitat modelling. Habitat suitability was determined from general habitat suitability curves developed from studies in other rivers.

Trotters Creek contains a diverse native fishery with several species of conservation importance. The habitat information showed maximum habitat for common bullies, redfin bullies, inanga, upland and juvenile brown trout is provided by a flow of 0.12 m³/s. Habitat declined sharply at flows between 0.01 m³/s and 0.07 m³/s for common bullies, redfin bullies, inanga, upland bully and juvenile brown trout. Maximum longfin eel habitat was provided by a flow of 0.06 m³/s, and there was a gradual decline in the amount of longfin eel habitat as flows reduced below 0.035 m³/s. Maximum habitat was provided for koaro at 0.2 m³/s with habitat declining sharply as flows fell below 0.035 m³/s. Maximum habitat for Canterbury galaxiids was provided by a flow of 0.035 m³/s, with habitat declining sharply as flows fell below 0.01 m³/s. Maximum habitat for adult brown trout was provided by a flow greater than 0.3 m³/s, with habitat declining sharply as flows fell below 0.09 m³/s.

This information is illustrated in Figures 2 and 3, below.

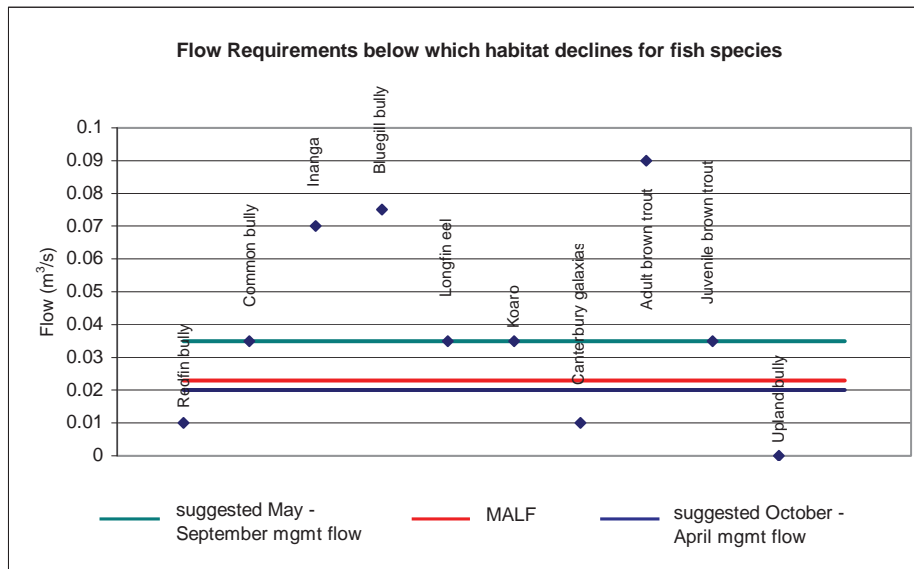


Figure 2: Flow requirements below which habitat declines sharply for fish species

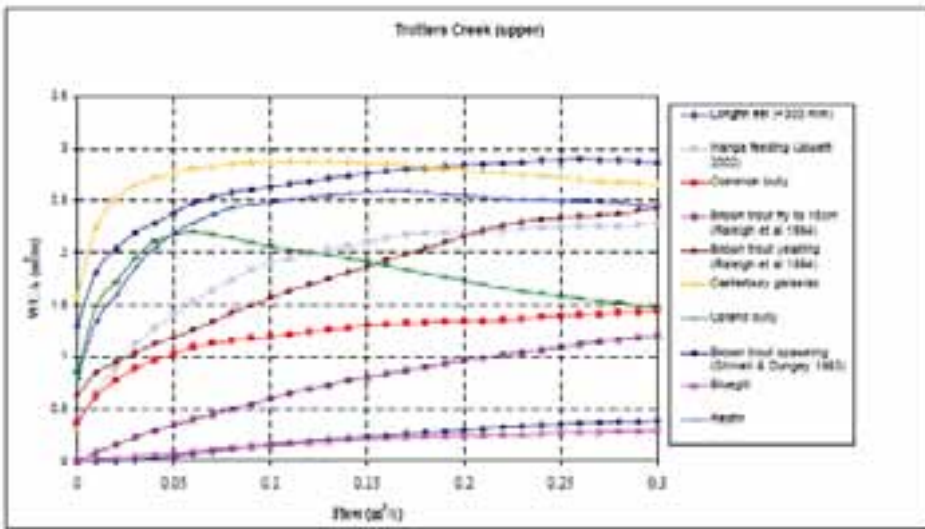


Figure 5: illustrates the survey results in more detail, with the first graph A showing the results for the “upper” creek’s fishery and graph B showing results for the “Lower” creek’s fishery

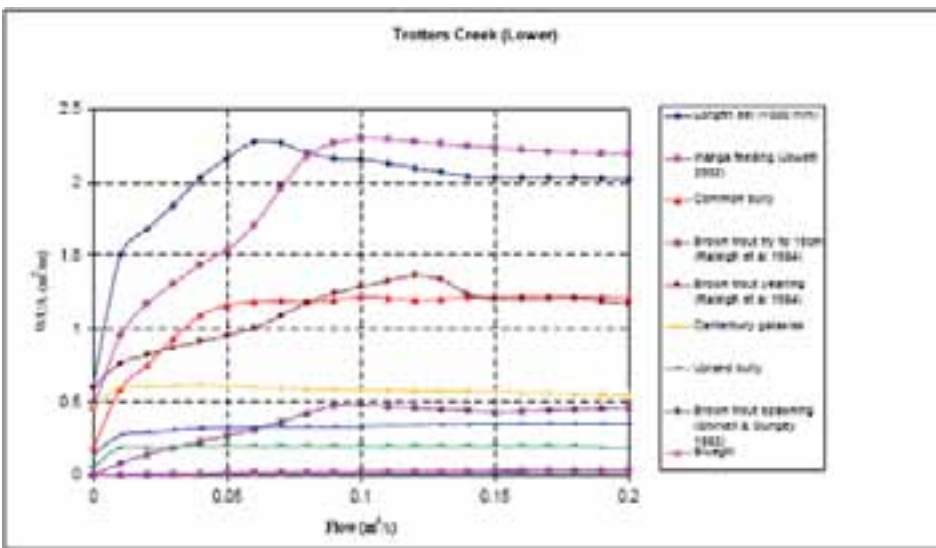


Figure 3: Variation of instream habitat (weighted usable area WUA) with flow in Trotters Creek

Minimum flows and irrigation

For Trotters Creek, preliminary investigations have identified a range of minimum flows and the potential effect on irrigation takes. At the suggested management flow for aquatic ecosystems of 0.02 m³/s it is probable that there would be a restriction on primary takes of approximately four days for the irrigation season.

It must be noted that due to a lack of continuous river flow data recordings Trotters Creek does not have reliable taking restriction information. There is no graph or table that can be generated. It is, however, possible to estimate the likely take restriction based on observations and statistical expectation of river flow behaviour near the MALF (MALF = 0.023 m³/s). Statistically, a river like Trotters Creek can be expected to flow below its MALF for less than five days per year on average.

References

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|-------------------------|---|
| Otago Regional Council. | (2004) Regional Plan: Water for Otago. Schedules 1A, 1B, 1C, and 1D (including other information sourced since the Plan was notified) |
| Otago Regional Council. | (2006a) Management Flows for Aquatic Ecosystems in Trotters Creek. |
| Otago Regional Council. | (2006b) Waiwera, Trotters and Luggate Catchments. Report 2007/031 presented to the 2007 Environment and Science Committee. |