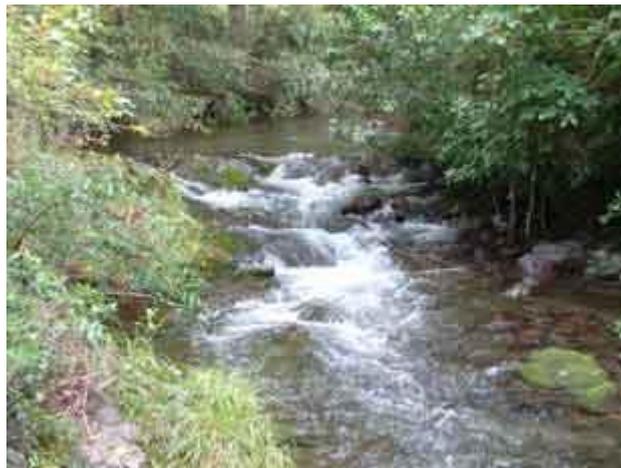




Wakapuaka River Water Temperature Survey 2009/11

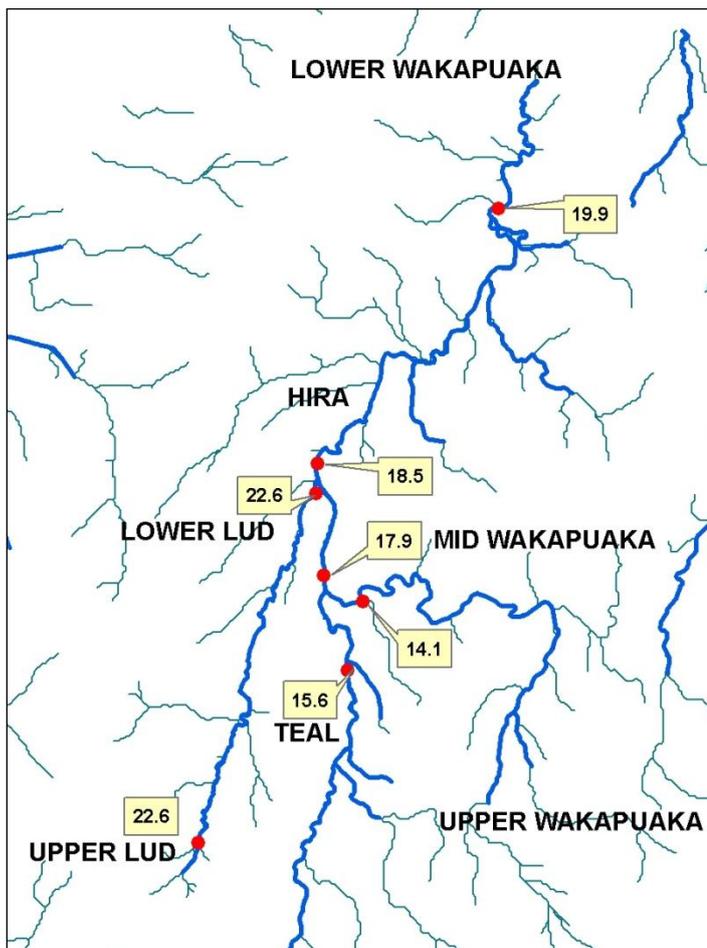


Wakapuaka River Water Temperature Survey 2009/11

This fact sheet provides information on the state of the Wakapuaka River and what you can do to improve its health. The Wakapuaka River and its tributaries shape the local landscape and are important to the local community for a number of reasons. Most notably as a shared drinking water supply for domestic use and livestock, recreation, cultural heritage values and tourism.

Monitoring river and stream health

The Nelson City Council (NCC) environmental monitoring has shown a decline in the overall water quality grades of the mid Wakapuaka and Lud River since 2007, summarised in the River and Stream Health Annual Monitoring Summary 2010. Elevated nitrate, bacteria and sedimentation are the main causes of the decline in the water quality grade. The latest water temperature survey is summarised here.



How we measured water temperature

Because temperature changes throughout the day and seasonally, water temperature must be logged continuously over 24 hours.

Seven temperature loggers were deployed at sites along the Wakapuaka River catchment from November 2009 to April 2011 (Figure 1).

These sites were chosen to compare the water temperature from the upper reaches of the catchment at Duck Pond Road (Hira Forest) to the lower reaches at Maori Pa Road (Cable Bay).

Temperature loggers were also deployed in the Teal and Lud tributaries, and down stream to measure their temperature effect on the Mid Wakapuaka River catchment in the lower Teal Valley and opposite Hira School.

Fig. 1 Critical water temperature (°C) recorded at each monitoring site, 2009/11

Critical water temperatures

The critical water temperature for fish and invertebrate survival is recognised at the *mid point between the daily maximum and mean water temperature*, which is used in this report (see Figure 1). National Institute of Water and Atmosphere research shows that critical water temperatures over 21.5°C cause 50% of mayflies and stoneflies to die and is detrimental to trout and some native fish species.

Overall, the critical water temperatures increased along the Wakapuaka River from 14.1°C in the upper reach (Duck Pond Road) to 19.9°C in the lower reach (Māori Pa Road). The corresponding temperature in the Teal was 15.6°C. The elevated temperature of 22.6°C in the Lud (upper and lower reach) is considered to contribute to the elevated average temperature of 18.5°C, 200 m down stream at Hira.

Water temperature extremes

Periods of calm, sunny weather give rise to increases in water temperature particularly when summer daylight hours are extended and rivers are at low flow. The aspect, slope and shading of the river from the sun are also important factors that can cause changes in water temperature along a river. The maximum Wakapuaka temperature range was between 16.0°C at Duck Pond Road and 21.3°C at Māori Pa Road. The maximum temperature in the Teal was 18.3°C compared to 26.3°C in the upper Lud and 23.5°C in the lower Lud.

Effects on wildlife

Elevated warm water temperatures greater than or equal to 21.5°C, measured in the Lud and lower Wakapuaka will be stressful to fish and invertebrate communities, particularly at low summer flows. These conditions along with elevated nutrients promote increases in aquatic plants and slime during summer months that are detrimental to aquatic animals and can limit flows. Ongoing monitoring of invertebrates has shown declines in community scores that reflect poor water quality and habitat but sampling is too infrequent to compare to high temperature events.

Ten freshwater fish species have been recorded in the Wakapuaka catchment, which include longfin eel, inanga, common, upland, redfin and giant bully, torrent fish and brown trout. Koaro and rainbow trout were only recorded in the forested upper Teal during the 2008 NCC native fish survey by Canterbury University. Koaro have a preference for forested streams, spawning in damp areas along the edge of rivers and streams. De-forestation of waterways, changes in land use and loss of damp spawning areas has probably curtailed the distribution of koaro and other native fish species.

Improving river habitat and water quality

- Increasing riparian planting along the waterway is an effective way of improving shading to the waterway and reducing water temperatures and has other benefits, providing river margin habitat, food (leaves and insect rain) and filtering sediment and contaminants from surface run-off from adjacent land. Financial support for riparian planting and fencing is available from NCC.
- The Wakapuaka River Care Group is a community led group that provides opportunity to learn more about the river and get involved with initiatives to improve the local environment.
- Records of freshwater fish distribution are sought to identify sites with high fish diversity and recreation value and where fish distribution has been influenced through habitat change.

For further advice and initiatives to improve the health of the Wakapuaka catchment:

Riparian planting, fencing and sustainable land management plans to improve water quality: Lynne Hall, NCC Land Advisor, Ph 035460308

Freshwater quality: Paul Fisher, NCC Monitoring Officer, Ph 035460291

Assisting with community monitoring of water quality and environment: Jane Pearson (Hira School), Wakapuaka Rivercare Group, Ph 035450942