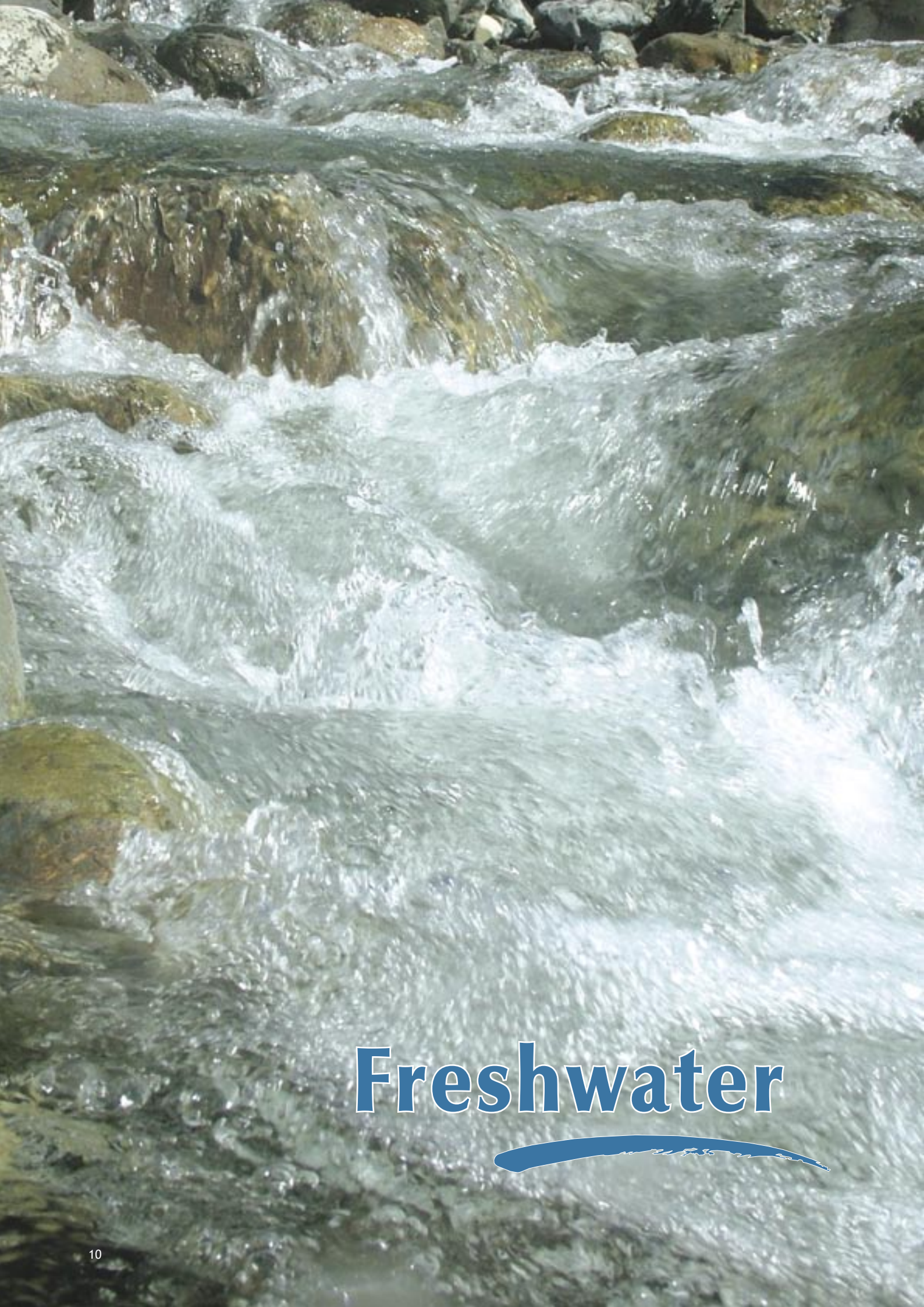


Freshwater

Rough Creek

FRESHWATER

Before human settlement, the entire length of Marlborough's river networks, from the fast flowing mountain streams down to the swamps and wetlands of the coastal margins, were surrounded by forest and natural vegetation. However, since humans settled here, there has been significant modification of our river systems and wetland areas in particular. Activities such as hydro-electric dams, land use and cover (indigenous forest, production forest and pasture), land drainage and the abstraction of water have affected the quality and quantity of water in rivers.

It is also important to recognise the inextricable link between surfacewater and groundwater systems in Marlborough, particularly in the Wairau catchment.

Fresh water is one of life's essential ingredients and maintaining the quality and quantity of this resource is critical for the wellbeing of the Marlborough community. The longer term impacts of some our activities are not well understood so continued monitoring will be important in sustainably managing the resources on which many of our day to day activities rely. It is important to recognise and react to water management issues, which affect ecological, cultural, amenity and recreational values, and the preservation of natural character of water bodies and their margins.

SURFACE WATER QUANTITY NETWORK

The Council operates a network of hydrological monitoring stations that measure and record river levels and flows, rainfall and groundwater levels. The information collected by this network is used for flood forecasting, planning and resource consent application processing.

The network includes baseline monitoring, targeted monitoring for specific purposes and intensive investigations for particular catchments. The baseline network consists of stations that are operated to give long-term regional trends. The targeted network is mostly used for monitoring the various flood and drainage schemes in the district, and other issues associated with these flood schemes. Intensive investigations are undertaken each year in a particular catchment to find out the characteristics of the water resources of that catchment. Investigations are also carried out where demand for water has arisen as a result of a specific activity or where the resource is in a stressed state.

Intensive investigations have continued in the Wairau Aquifer springs, as well as the springs and ephemeral streams associated with the Benmorven and Fairhall River Gravel aquifers. These investigations are being undertaken to see what effects groundwater and surface water abstractions have on the spring systems.

Flaxbourne River monitoring site

Monitoring Wairau River flow

Permanent flow monitoring stations have been installed in the Tuamarina and Opawa Rivers. The data from these stations will enable the Council, water users and interest groups to develop a better understanding of these water resources. The Opawa River station has been installed specifically to monitor and assist with the management of the Gibson Creek/Opawa River rewatering as part of the Southern Valleys Irrigation Scheme, which is scheduled to be commissioned in November 2004.

The baseline network monitoring continued as scheduled during the 2003/2004 year.

RAINFALL AND RIVER FLOWS 2003/2004

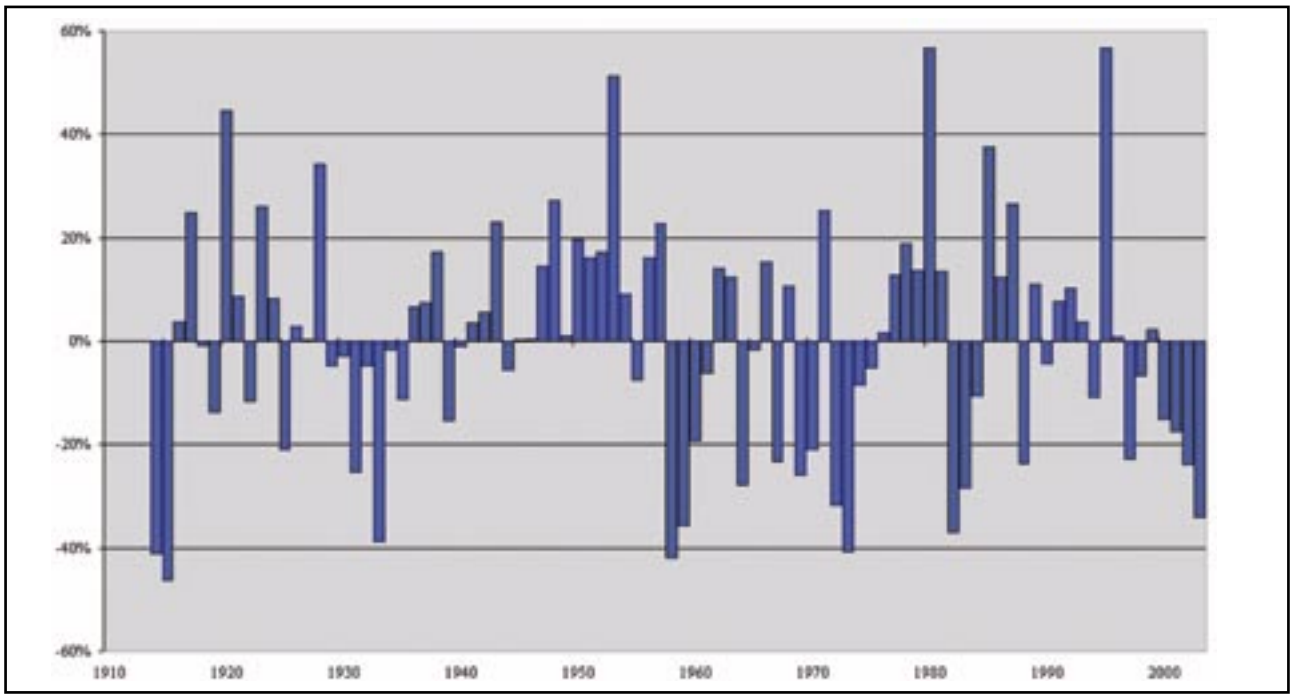
2003/2004 provided a period of extremes, ranging from the continuing dry conditions in the Flaxbourne area to the devastating Picton floods in February 2004. The remainder of the district experienced both wet and dry conditions but didn't deviate, as a whole, far from normal.

The Flaxbourne area has continued to suffer from very dry conditions. Notices were issued by the Council, under the powers of the Resource Management Act 1991, to water permit holders to stop taking water for irrigation from the Needles Creek (a tributary of the Flaxbourne) for six months from 24 December 2003 to 9 June 2004. This was to protect domestic and stock water supplies.

Figure 3 shows just how severe the current drought is in the Flaxbourne area is. The annual percentage deviation from normal rainfall is shown for the Chancet raingauge at Ward. Data are available for this raingauge from 1914 to present. This graph clearly shows the severity of the current drought with a succession of dry years since the wet year of 1995. This lower than normal rainfall period has lasted some eight years with out respite, which is unprecedented in the 90 years of record.

In contrast to these very dry conditions, an intense rainfall event located in the Marlborough Sounds occurred on 17 February 2004. Extremely high rainfall rates were recorded in the headwaters of the Waitohi, Waikawa and Graham Rivers. Rain began to fall across the affected area around 4:00am on the morning of Tuesday 17 February 2004. A heavy burst of rainfall started around 7:30am with the highest intensities falling between 8:15am and 9:15am. By 10:30am rainfall had

Figure 3: Chancet (Ward) Raingauge - Annual Percentage Deviation from Normal



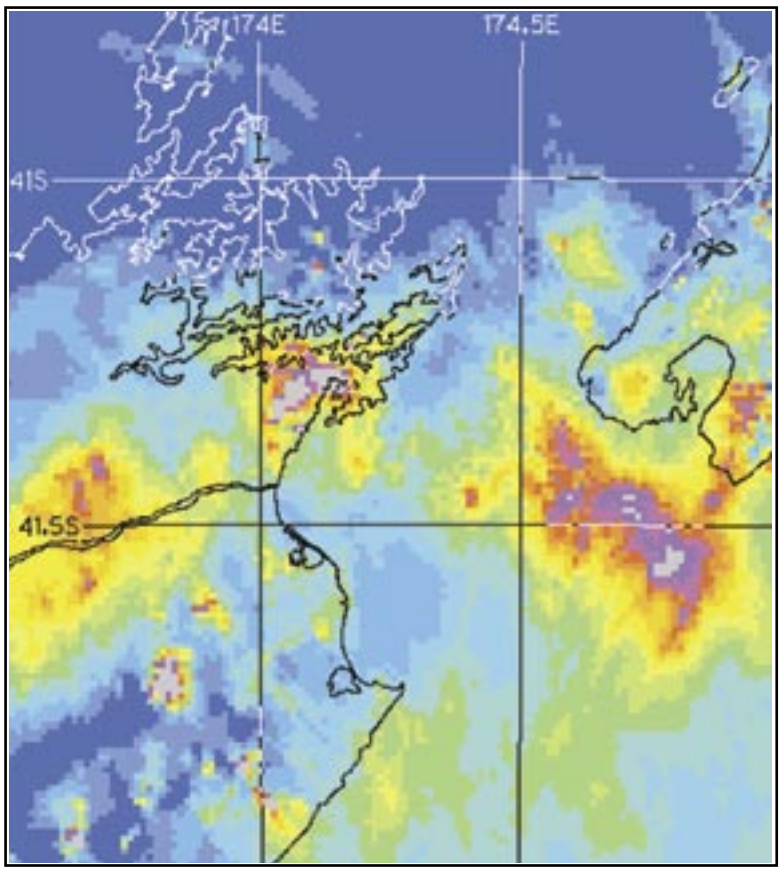


Figure 4: Radar image for 17 February 2004 rainfall event

eased and stopped altogether by 11:30am. The largest totals and highest rainfall intensities fell in the upper catchments of the Waitohi, Waikawa and Graham River (Whatamango Bay) catchments.

The Boons Valley (Waikawa) raingauge recorded the highest total for the event with a total of 118mm. The normal February rainfall for the Boons Valley raingauge is 68 mm - this amount fell in approximately one hour during the event. For the month of February 2004, a total of 300 mm of rain fell, which is five times the normal monthly rainfall.

Figure 4 shows an accumulated rainfall radar image for the 17 February event. Rainfall rates in the grey area centred over the headwaters of Waitohi, Waikawa and Graham Rivers are in excess of 100mm for the event.

Analysis has been carried out on the rainfall data collected from this event to try and determine its magnitude. For the headwaters of the Waitohi, Waikawa and Graham Rivers, the rainfall was well in excess of a 100-year event i.e. less than 1% chance of occurring in any one year. For the headwaters of the neighbouring catchments, Tuamarina and Stace Creek, and the urban confines of Picton and Waikawa, the amount of rain that fell was quantified as being between a 40 to 100 year event i.e. 1-2.5% chance of occurring in any one year.

Further information on the flooding that occurred as a result of this intense rainfall can be found in the chapter on Natural Hazards.

Waikawa Marina and Bay discoloured by floodwaters from Waikawa Stream

RECREATIONAL BATHING WATER

Monitoring of freshwater bathing sites is carried out every summer (generally from the beginning of November to the end of March). The Council has been collecting water samples for more than 5 years at 12 regular monitoring sites. Samples are gathered on a weekly basis and analysed for the presence of E.coli bacteria, which is the preferred indicator organism for freshwater bathing quality. E.coli are bacteria that indicate the presence of faecal contamination from warm blooded animals. The pathogens (an organism that carries disease) occurring in contaminated freshwater are the same as those occurring in marine waters, except that survival times in freshwater are likely to be longer, especially for protozoan cysts (e.g. Giardia and Cryptosporidium) and viruses.

The Council uses the Ministry for the Environment guidelines to assess whether or not water is suitable for recreational bathing. These guidelines are shown in Table 1.

Table 1: Ministry for the Environment Monitoring Guidelines (2003)

Surveillance, Alert and Action Levels for Freshwater

Acceptable/Green Mode:

No single sample greater than 260 E. coli/100mL

- Continue routine (eg weekly) monitoring.

Alert/Amber Mode:

Single sample greater than 260 E. coli/100mL

- Increase sampling to daily (initial samples will be used to confirm if a problem exists).
- Consult the catchment assessment checklist to assist in identifying possible sources of faecal contamination.
- Undertake a sanitary survey, and identify sources of contamination.

Action/Red Mode:

Single sample greater than 550 E. coli/100mL.

- Increase sampling to daily (initial samples will be used to confirm if a problem exists).
- Consult the catchment assessment checklist to assist in identiying possible sources of faecal contamination.
- Undertake a sanitary survey, and identify sources of contamination.
- Erect warning signs.
- Inform public through the media that a public health problem exists.

Swimming in the Taylor River

At times the water quality at all sites is unsuitable for recreational use. Generally this can be related to rain events in the river catchment. Following are the results for the three catchments that are monitored by the Council: the Rai/Pelorus catchment; Wairau River catchment; and Taylor and Opawa Rivers.

Pelorus Bridge monitoring site

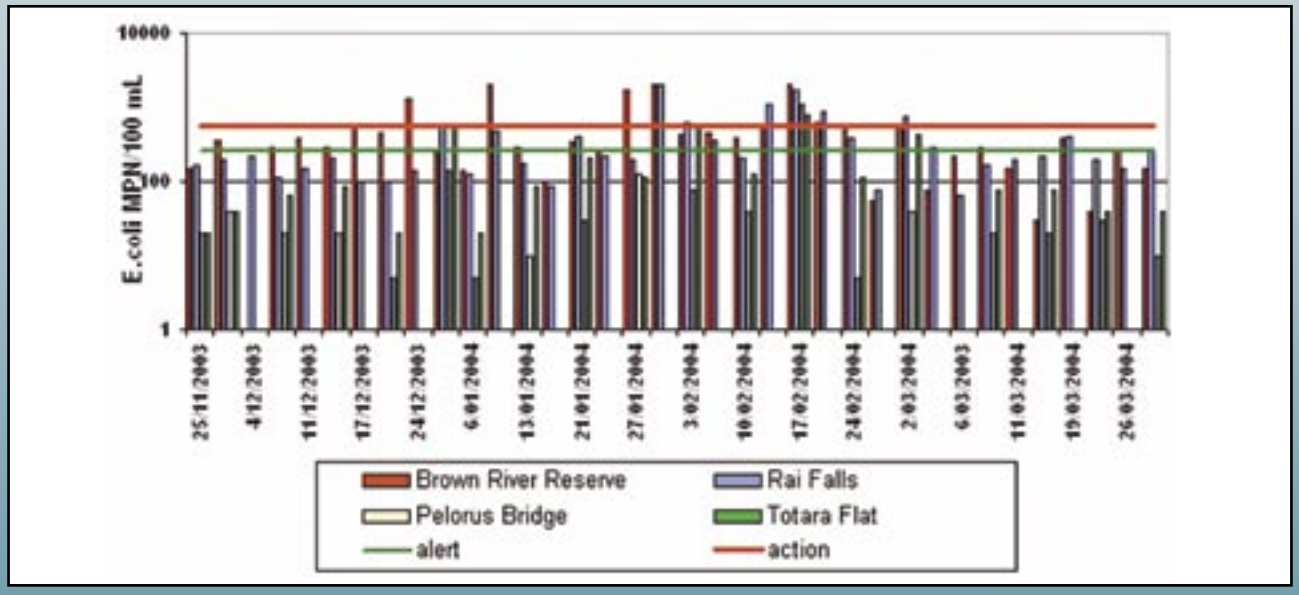
RAI AND PELORUS CATCHMENT

The Council monitors five sites in this catchment. These sites are the Rai River at Carluke Bridge, at Brown River Reserve and at Rai Falls, and the Pelorus River at Pelorus Bridge and at Totara Flat. Figure 5 shows the results for the summer monitoring period for four of these sites. The Carluke site has not been included in the results as monitoring has only just commenced at this site.

More frequent monitoring was carried out at the Brown River Reserve and Rai Falls sites, because these are popular recreational sites. The monitoring shows that water quality at these two sites is not very good, with the action guidelines being exceeded relatively frequently. The Council needs to do frequent monitoring and alert the public if the water quality might be a risk to public health.

In contrast, the two sites on the Pelorus River, Totara Flat and Pelorus Bridge, more consistently meet the freshwater guidelines.

Figure 5: Rai/Pelorus River results for November 2003 to March 2004



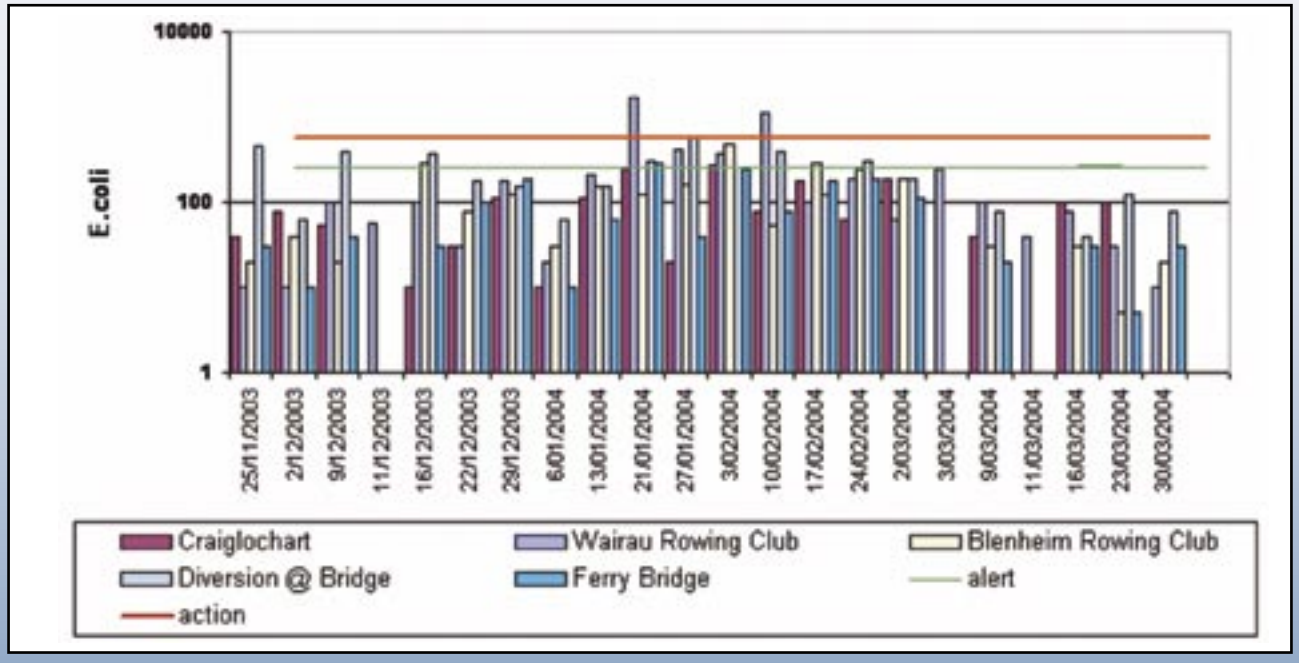
Waihopai River at Craiglochart

WAIRAU RIVER CATCHMENT

The Council monitors five sites in this catchment. These sites are the Waihopai River at Craiglochart, the Wairau River at the Wairau Rowing, Blenheim Rowing Club and Ferry Bridge and the Wairau Diversion at the bridge. Figure 6 shows the results for the summer monitoring period for these sites.

Results show that water quality at the monitoring sites was generally suitable for recreational use with only two occasions when the Ministry for the Environment action guideline was exceeded (at the Wairau Rowing Club site on the Wairau River). Historically the two sites where water quality monitoring has shown low levels of E.coli, are Craiglochart on the Waihopai River, and at Ferry Bridge on the Wairau River. The results for 2003/2004 have shown that this trend is continuing.

Figure 6: Wairau River and Wairau Diversion results, 2003 to 2004



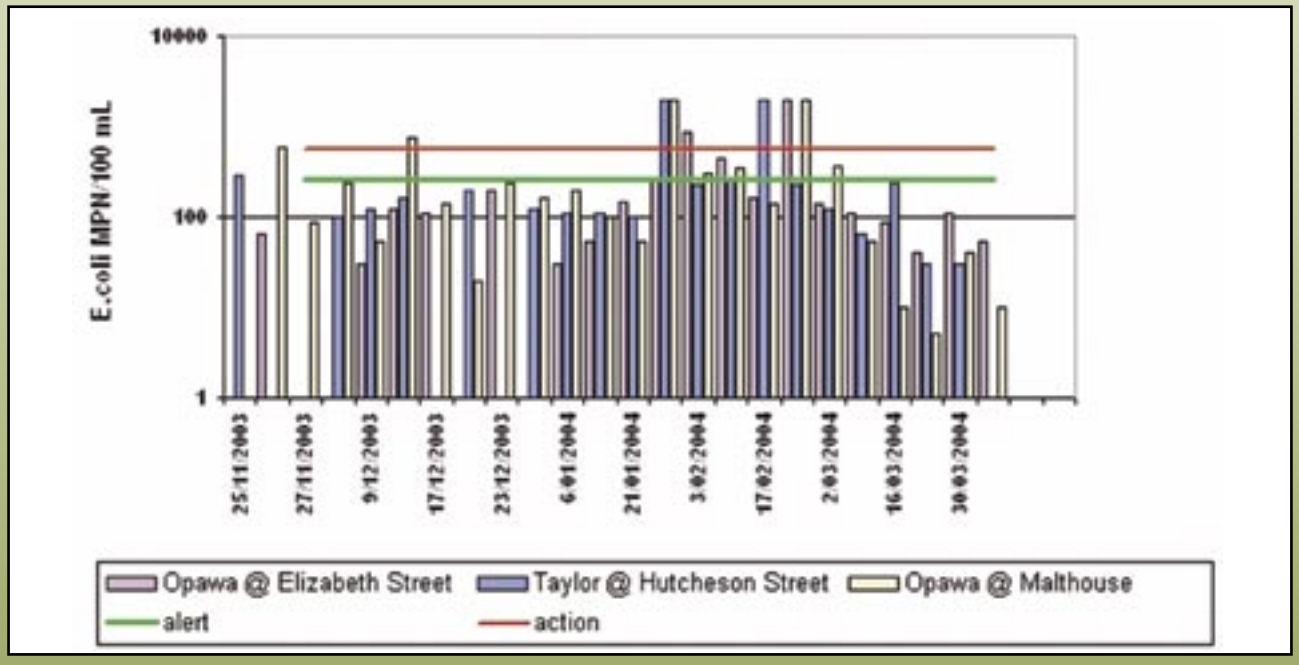
Opawa River at Elizabeth Street Bridge

TAYLOR AND OPAWA RIVERS

The monitoring results for three sites on the Taylor and Opawa Rivers are shown in Figure 7. These sites are the Taylor River at Hutcheson Street, and the Opawa River at Elizabeth Street and at Malthouse Road.

All three sites have exceeded the guideline levels and have been unsuitable for recreational use.

Figure 7: Taylor and Opawa Rivers results for November 2003 to March 2004



Culverts need to be installed correctly to allow fish passage

MANAGING DAIRY HERD STREAM CROSSINGS IN THE RAI RIVER CATCHMENT

The 2002/2003 State of the Environment Report Update outlined a strategy to deal with the adverse effects of dairy herds crossing through streams and rivers in the Rai River catchment. Crossing through streams has a dramatic impact on water and habitat quality at, and downstream of, crossing points. This is because as a group, the herd disturbs the bed of the stream, releasing sediment into the water column, while individual cows defecate/urinate. This results in the discharge of bacteria and nutrients into the water, and means that instream ecology and the community's ability to use the streams and rivers have been adversely affected.

The aim of the strategy is to improve water and habitat quality in the area by removing use of crossings directly through the streams. All 99 stream crossings identified during the stream crossing survey of January and February 2003 have been ranked based on the frequency of crossing, herd size and the nature of the waterbody. Each crossing now has a significance rating of between (1) and (5): crossings with a significance rating of (1) have the greatest potential for adverse effects, while crossings with a rating of (5) have the least potential for adverse effects.

The immediate goal is to get rid of all Category 1 and 2 crossings by August 2006. Negotiations with the 19 affected farmers started in October 2003 and 13 have now entered into agreements with the Council to remove the Category 1 and 2 crossings on their properties within this timeframe. (Negotiations are continuing with the remaining 6 farmers and it is likely that the timeframes will need to be extended due to their particular circumstances.)

Overall, the farming community's response to the strategy has exceeded expectations, in that it has also extended beyond just Category 1 and 2 crossings. The Council has to date received resource consent applications to authorise works, such as for the construction of bridges and culverts, to do away with 46 crossings on 14 farms. This is almost half of all crossings in the Rai River catchment. Works have already been completed on removing 10 of these crossings.

The Council will continue to work with farmers to make sure all agreements are fulfilled and will also start monitoring of water and habitat quality for signs of improvements. All progress with implementing the strategy is reported back to dairy farmers within the catchment through regular newsletters.

It is hoped to undertake stream crossing surveys in other catchment areas over the next year, with the Pelorus and Tuamarina catchments likely survey areas.

Another bridge is successfully installed, avoiding the need for dairy cows to cross directly through the river

With improved irrigation, dairy farming is expanding into areas once considered too dry

DAIRYING AND CLEAN STREAMS ACCORD - MARLBOROUGH REGIONAL ACTION PLAN

Dairying is a significant land use in New Zealand. However, there have been increasing concerns regarding the effects of this intensive land use on the quality of water within our streams, rivers, lakes and wetlands.

The Dairying and Clean Streams Accord is an agreement between the Fonterra Co-operative Group, regional councils, unitary authorities (such as the Marlborough District Council), the Ministry of Agriculture and Forestry and the Ministry for the Environment, to improve the environmental performance of dairying. It establishes a goal of achieving "clean healthy water in dairying areas".

Five priorities for action are identified in the Accord to reduce the impact of dairying on streams, rivers, lakes and wetlands: cattle access to water bodies, dairy herd stream crossings, dairy shed effluent discharges, nutrient management and wetlands. Each of these priorities has a national performance target, as follows:

- Dairy cattle are excluded from 50% of streams, rivers and lakes by 2007, 90% by 2012;
- 50% of regular crossing points have bridges or culverts by 2007, 90% by 2012;
- 100% of farm dairy effluent discharges comply with resource consents and regional plans immediately;
- 100% of dairy farms have in place systems to manage nutrient inputs and outputs by 2007; and
- 50% of regionally significant wetlands to be fenced to prevent stock access by 2007, 90% by 2012.

A further priority for action is the preparation of "Regional Action Plans" to be developed by Fonterra and each of the regional councils and unitary authorities to help in implementing the Accord. The Marlborough Regional Action Plan, prepared in consultation with Federated Farmer and Fonterra shareholder representatives, became operative in June 2004. It sets out local commitments toward achieving the Accord's goal, whilst taking into account local circumstances. These commitments focus on the priorities for action already established by the Accord, but with a local target set for each priority, as set out in Table 2.

The local targets match those set out in the Accord, except for stream crossings in the Rai River catchment and the management of dairy shed effluent. The reason for the difference in these latter targets is the fact that the Council has developed specific strategies to deal with statutory responsibilities under the RMA.

The Regional Action Plan also identifies actions to be taken by the Council and Fonterra, aimed at achieving the local targets. Fonterra will monitor progress toward achieving the local targets through annual on-farm assessments.

Water troughs allow cows to access water without entering streams

Dairy farmers have been informed of the Regional Action Plan and the local targets through a brochure and further information will be provided on a one-on-one basis during the annual dairy shed effluent discharge inspections.

Table 2: Marlborough Regional Action Plan Targets

Stock access to waterbodies

- Dairy cattle are excluded from 50% of streams, rivers and lakes by 2007, 90% by 2012.

Dairy herd stream crossings

- 90% of category 1 and 2 dairy herd stream crossings in the Rai River catchment are eliminated by the commencement of milking season (August) in 2006.
- Except for those stream crossings in the Rai River catchment, 50% of all other crossing points have bridges or culverts by 2007, 90% by 2012.

Management of dairy shed effluent

- There is no "major" non-compliance with relevant resource consents or permitted activity rules.
- The rate of "minor" non-compliance with relevant resource consents or permitted activity rules shall not exceed 15% in any one milking season and any instance of "minor" non-compliance shall be rectified to the satisfaction of the Council within 2 weeks.
- All dairy farmers that require a discharge permit to discharge dairy shed effluent onto land are operating with the necessary consents.

Nutrient Management

- 100% of dairy farms to have in place systems to manage nutrient inputs and outputs by 2007.

Wetlands

- 50% of regionally significant wetlands to be fenced to prevent stock access by 2007, 90% by 2012.

MANAGING AQUATIC VEGETATION IN THE TAYLOR RIVER

The native aquatic plant Potamogeton cheesemanii growing amongst the introduced and invasive curly oxygen weed

Vegetation growing in waterways is often simply referred to as 'weed' and is considered to be unsightly and unwanted. There is no doubt that some species of aquatic vegetation are weedy and are detrimental to the environment, however, there are species, both native and introduced, that are valued. Watercress for example, has cultural values and is considered to be a food source by iwi. Aquatic vegetation also provides valuable habitat and food for species of native fish, invertebrates and birds. Some of our native aquatic vegetation is very rare and considered to be endangered.

Over the last three years there has been increasing public interest in the manner that aquatic vegetation is removed from the Taylor River through Blenheim. The primary reasons for aquatic vegetation control in this area are for aesthetic reasons and recreational use, while maintaining and enhancing ecological values and inter-related water levels.

The Council has been undertaking trials of different methods of vegetation removal to determine which method is the most ecologically friendly. After six different trials the most acceptable method to date, has been the use of a digger equipped with a tined bucket on a long reach boom to slowly lift the vegetation above the water. Before the vegetation is placed on a truck for direct removal, the bucket is paused above the water for a few seconds to allow koura, eels and other fauna to escape. A strip of vegetation one metre wide will be left along the edge of each bank with a small amount of vegetation being left in the channel for ecological purposes. The timing of the vegetation removal will also be sympathetic to the life cycles of instream life.

CONTROL OF NUISANCE AQUATIC VEGETATION USING BLACKOUT SHADING

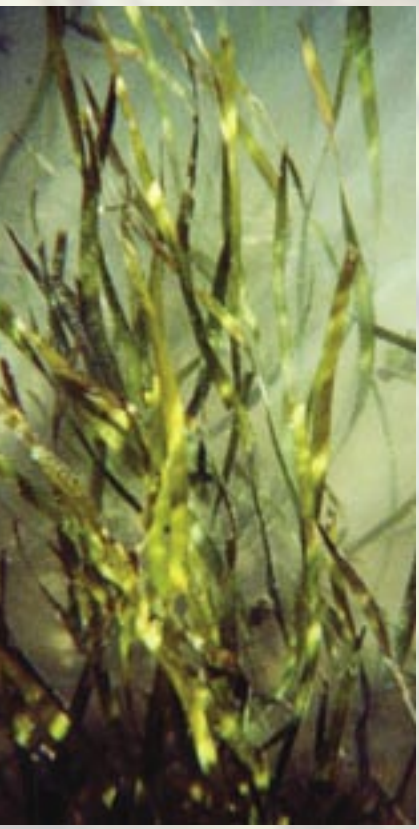
The 2002/2003 Update report described a trial undertaken to see if blackout shading would kill the invasive pest plants Lagarosiphon major and Egeria densa. These are the most aggressive growing aquatic plant species present in Marlborough. They grow prolifically and reduce the efficiency of the water flow, resulting in the loss of production on surrounding farmland, and are seen by many as aesthetically unpleasing.

To see if blackout shading would kill the Lagarosiphon major and Egeria densa plants, or simply put them into a period of dormancy, to reappear once the shading was removed, a stream was shaded for 8 months and then vegetation re-growth was monitored. The trial showed that blackout shading was a successful method of eradicating these two pest species from small waterways as after a period of 20 months no re-growth was recorded. Lagarosiphon and Egeria have now re-established themselves in the trial area through a small amount of lateral growth up stream and reinfestation through inappropriate dumping of vegetation removed during drainage operations.

Phase two of the trial has been set up using one layer of weed mat for a shorter period of 3 months. Initial results with this faster, and more cost effective method, are looking positive.

Phase 2 of shading experiment on Roses Creek

Diver removing eel grass from the Opawa Loop



Eel grass removed from Marlborough's waterways

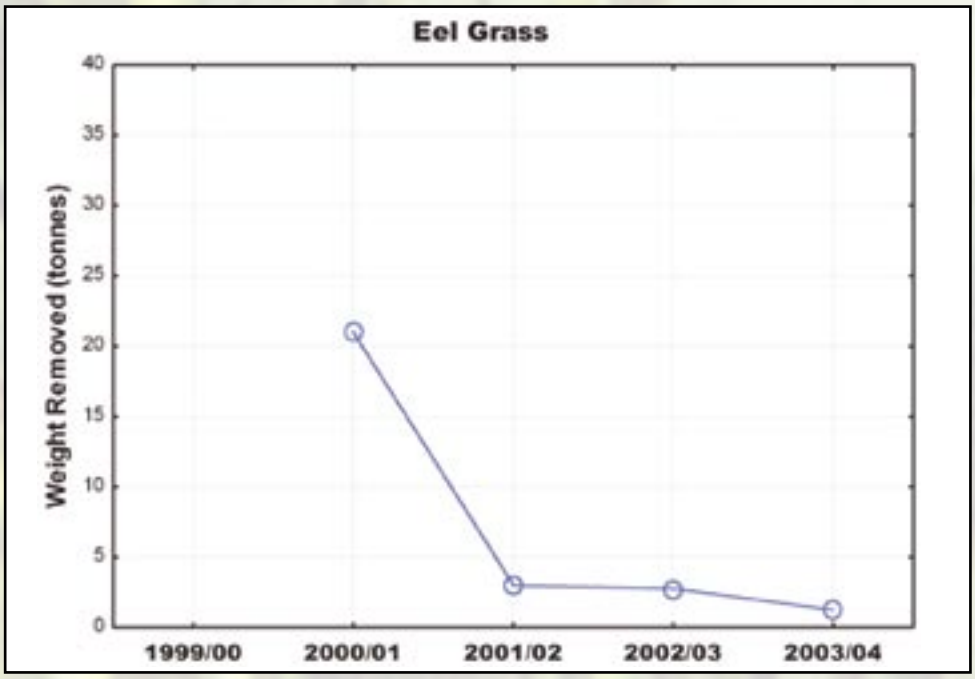
EEL GRASS INFESTATION

Eel Grass is a submerged, aquatic, perennial herb that is a potential competitor with native wetland and aquatic species. It will block drains and impede water flows. Eel grass spreads by rhizome fragments, which is often aided by humans who throw this popular aquarium plant into waterways.

This plant pest is classified as a Total Control plant pest in the Regional Pest Management Strategy for Marlborough. This classification means that areas that are known to have this weed will be inspected annually and any plants found will be destroyed.

In Marlborough, there are six sites in the Opawa River loop near Blenheim, which are known to have eel grass. There is also a small infestation in Waterlea Creek. In 2000/2001 a total of 21 tonnes of eel grass was removed from waterways. This has reduced significantly, with only about 1.25 tonnes being removed over the past year from the Opawa Loop - see Figure 8, which shows the amount of eel grass in tonnes, that has been removed over the past 4 years from Marlborough's waterways.

Figure 8 - Eel grass removal from Opawa Loop



Parrots Feather

Senegal tea

NEW AQUATIC PLANT PESTS FOUND

During the first half of 2004 two new aquatic plant pests were found in Marlborough. The first was Parrot's feather (Myriophyllum aquaticum), which was initially found in the upper Gibsons Creek area. Parrot's feather is a perennial freshwater plant that forms dense sprawling mats in still or slow moving water. It will also grow on damp ground like mud banks and in wetlands. This plant is classified nationally as an unwanted organism, which means it is banned from being sold, propagated and distributed. Parrot's feather will have serious implications for river, drainage and wetland systems if allowed to establish in Marlborough - see newspaper article from the Saturday Express on Page 24.

Subsequent to this newspaper article, numerous calls were received from the public. These calls lead to the discovery of Parrots feather at other sites. Inspections carried out by the Council's staff confirmed its presence at six new locations. In undertaking these investigations the discovery of two sites of the nationally unwanted plant, Senegal tea (Gymnocoronis spilanthoides) was also made.

Senegal tea is a perennial, semi-aquatic herb growing up to 1.5 metres tall when flowering. It is restricted to wet marshy soils, still or flowing water and prefers fertile conditions. Seed and stem fragments are spread by water movement or by animals and humans. Until recently it was sold as an ornamental pond and aquarium plant. It is extremely invasive and its discovery in Marlborough is of concern.

It is anticipated that further sites of both these unwanted organisms may be discovered in the future. The plants at the known sites have been destroyed. Follow-up monitoring will take place later in 2004. The Council is also considering including these two aquatic pests within the Regional Pest Strategy for Marlborough, when it is reviewed in about 18 months time.