

# water update

## Consultation proceeding

Some important issues await decision as parts of the Central Plains Water feasibility study, currently in preparation, will be completed shortly. Information sought by stakeholders includes:

- The impact of supplying water to 10,000 hectares in the Sheffield/Springfield area.
- The effects of taking 40 cubic metres of water per second from the Waimakariri River, when the average flow is 130 cubic metres per second.
- The impact on the communities of Glentunnel and Coalgate of issues relating to State Highway 77, dam safety, the Wairiri Valley and the Selwyn River.
- The extent of any increase in groundwater nitrate levels from intensified land use.
- The impact of a scheme on groundwater levels around Ellesmere.
- The cost of water to irrigators.

Information to better understand these and other issues will come from:

- An optimisation study, defining the likely area of demand and outlining how and when water might be used from each river or from the storage reservoir.
- A report on the impact of takes on surface water resources.
- A social impact report, examining the implications on communities of a water enhancement scheme.
- A cultural impact report examining the proposed scheme against tangata whenua values.
- A groundwater model based on a hydrogeological study of the region.
- Comparing the cost of water from a community scheme with costs to drill and pump water in the same area.
- A finance options study, examining equity ownership levels, debt servicing costs and the possibility of mixing public and private ownership of a scheme.

All these findings will be discussed with stakeholders before recommendations on the scheme feasibility are made to the two parent Councils. A decision on whether to proceed with the project is expected from the two Councils in March.



Quality of lowland rivers and streams – a crucial consideration for scheme feasibility  
Canterbury Mudfish



### Potential enhancements for Christchurch City outlined

A recently completed report for Central Plains Water outlines how a community irrigation scheme for Central Canterbury might enhance Christchurch water.

Options for augmenting the city's water include:

- Direct connection from the scheme to the sources of spring-fed streams that flow into the Heathcote and the Avon rivers.
- Treatment of scheme water to drinking standard and distribution through the city's water supply.
- Injecting water from the scheme into the aquifers from which the city's water supply is drawn.
- Transporting scheme water through existing races to augment groundwater supplies used for irrigation within the city boundaries.
- Using scheme water to create or enhance wetlands connected to the city's spring-fed streams.
- Creating large shallow spreading basins in the lower reaches of the scheme that would recharge the city's system of groundwater and spring-fed streams.

The report shows that all of these enhancements might be possible, but that in general the effectiveness will be low and the cost high compared with alternative ways of achieving the same results. The report will be considered by Christchurch city's water engineers.

## Impact on fish

Fish passage and habitats for fish and wading birds are not likely to be affected by the community water enhancement proposals under investigation by Central Plains Water, according to a report by the National Institute of Water and Atmospheric Research (NIWA).

According to the NIWA report however, salmon fishing is likely to be affected, particularly in the Waimakariri, because of its lower minimum flow and greater effects of sediment flushing in downstream fishing areas. Ideally flushing will take place during flood conditions, when the rivers will have the capacity to rapidly disperse the material. Because floods are not frequent during the main fishing season (February to March), a flushing regime will probably be needed. This will normally disperse sediment up to five km downstream from the stilling basins, so impacts on downstream habitats would not be extensive. During long low flows in late summer and early autumn however, flushing will have greater impact downstream, particularly on water clarity, which is important for salmon anglers. During low flow times there is less sediment to be flushed.

Reducing the impact of sediment flushing on salmon fishing is possible and is undertaken by the Rangitata Diversion Race.

Canterbury mudfish, an endangered species, is present in drains in Wairiri Valley. The proposed reservoir would alter this habitat. The NIWA report says it should be possible to capture and transfer these fish into a purpose built reserve in the adjacent Glendore catchment.

## Alternative to groundwater demand

~ Mike Bowden

Groundwater between the Waimakariri and Rakaia consented by Environment Canterbury to be taken for irrigation has increased by 50 per cent since 1995 to around 33 cubic metres per second. This is via a total of more than 1,650 different consents.

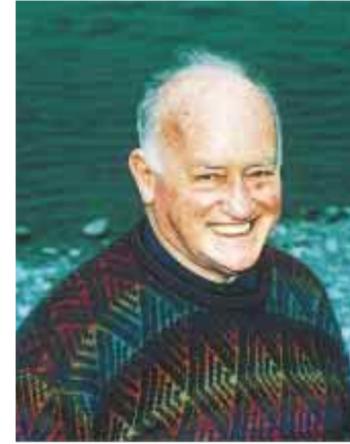
Improved drilling technology and economic pressure is encouraging farmers further and further up the Plains to drill, pump and irrigate. The consented 33 cubic metres per second supplies around 70,000 hectares, just under one third of which is west of a line between Rakaia and Aylesbury, in the area identified for supply by the scheme Central Plains Water is investigating.

Precise quantification of the aquifers from which this groundwater is taken is not easy. Environment Canterbury uses a series of monitoring wells throughout the district.

Varying restrictions are imposed if these monitoring wells indicate decreased aquifer levels. If a community scheme using surface water proceeds, the increase in groundwater consents is likely to stop and monitoring will be a much more straightforward exercise.

What is required is a balanced approach. Irrigation is becoming more important for farmers right across the region. If surface water could be used by those farming up the Plains and groundwater by those down the Plains, we would see a balance and the best use of the available resource.

*Mike Bowden is a groundwater engineer and was chief executive of the Canterbury Regional Council (now Environment Canterbury) from 1990-96. He recently received an Outstanding Achievement award from Environment Canterbury.*



## Professionalism and value driving irrigation efficiency

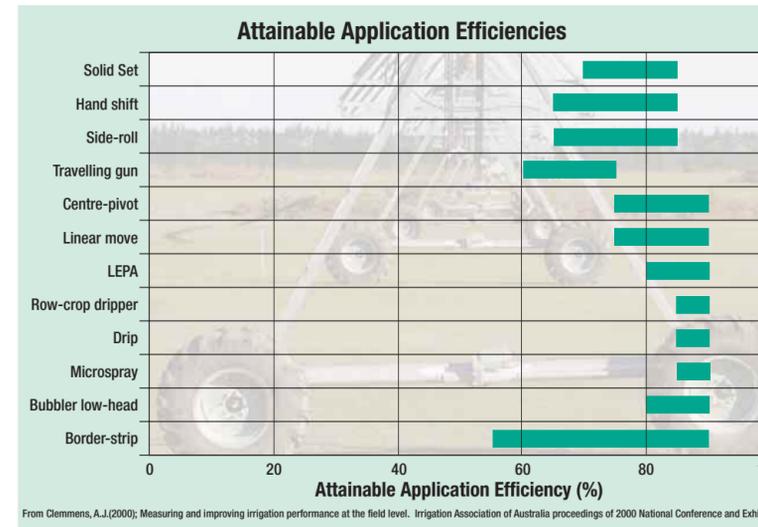
As land is increasingly irrigated in New Zealand, so irrigation practices become more efficient. In the past there may have been a perception that irrigation 'wastes' water. When water is seen as plentiful, this may not be a problem. When it becomes scarce, obviously it is more highly valued.

One of the key factors constraining efficient irrigation practice is unreliable or inflexible water supply.

Proposals for large community schemes with capacity for storage are designed to improve the reliability possible with more traditional schemes. Similarly, schemes with a piped supply provide greater flexibility.

As irrigation becomes more sophisticated and better integrated into agricultural management systems, efficiency is improving. This is seen in increased use of performance measures, the design of farms around irrigation systems – rather than vice versa, professionalism in irrigation design, more research, better training for irrigation users and improved understanding of different soil types, particularly soil moisture measurement.

Another factor encouraging increased efficiency is the attitude change from regarding



From Clemmens, A.J.(2000); Measuring and improving irrigation performance at the field level. Irrigation Association of Australia proceedings of 2000 National Conference and Exhibition.

irrigation as drought insurance to seeing it as an essential farm input and integral to the successful management of a farm.

Ultimately there is no single definition that covers all aspects of irrigation efficiency – it means different things in different situations and will

depend on a number of factors, including energy, labour, capital investment, environmental impacts and the supply and application of water.

The table above demonstrates attainable application efficiencies from various different irrigation methods.

# water

## Rangitata Conservation Order Opposed

The New Zealand Fish and Game Council has applied to the Minister for the Environment for a Water Conservation Order for the Rangitata River. One of 1,200 submitters, Central Plains Water has submitted to the Minister's tribunal asking that the application be declined.

Central Plains Water opposes a conservation order for the Rangitata for the following reasons:

- It would not balance protection of the river with the opportunity for social, economic and cultural development. A regional river plan would do this better.
- The values of the Rangitata River are not outstanding enough to warrant the protection of a conservation order.
- The order would undervalue the needs of primary and secondary industry. This would reduce the amount of water available from the Rangitata, therefore increasing competition for water that might be available from the Rakaia River, which would have an adverse impact on a water enhancement scheme for the Central Plains.

In its submission to the tribunal, Central Plains Water comments that all significant water developments in the future are likely to rely heavily on storage to be able to provide a reliable supply.

Hearings on the application started in early October and are expected to run intermittently through until early December. A decision is expected early next year.

### Stringent safety measures for dam

If a community water enhancement scheme for the Central Plains goes ahead a 47 metres high, 600 metres long dam would be built at Wairiri Valley to form a reservoir. An earth dam is most appropriate for the purpose, topography and geology concerned. Because the Wairiri Valley has little natural catchment, heavy rainfall would have minimal impact on the reservoir, making overflow from the dam unlikely.

Professionally constructed earth dams have a far better safety record in earthquakes than do concrete dams.

Owners of large dams apply rigorous safety programmes to their assets. A typical dam safety programme might include:

- Regular surveillance and maintenance, including visual observation and monitoring of surveillance data .
- An annual dam safety review consisting of analysis by dam specialists of the surveillance, observation and monitoring for the previous year.
- An independent dam safety review, typically carried out once every five years, reviewing the design, construction and operational history of the structure and identifying what might possibly compromise its safety.
- Deficiency evaluation and remediation, which investigates and evaluates any risks monitored in the routine surveillance, specific investigation or independent safety review.
- An emergency plan to manage safety during an earthquake or flood, prepared to avoid or minimise the consequences of a dam failure.
- A safety training programme for those working regularly on or around the dam.

If serious problems are monitored with the proposed Wairiri dam, they will be identified very early. For this dam it will be possible to turn off the intakes and completely empty the reservoir in 44 days.

# quick questions

SH77 from the Wairiri saddle



**Q. What will happen to State Highway 77?**

**A.** If the scheme proceeds, six km of SH77 in Wairiri Valley would be inundated. Relocating this section of highway could be either by rebuilding the road on the ridge of the Harper Hills or by upgrading and re-designating the section of Downs Road that presently skirts the foothills. Residents of Glentunnel say they wish SH77 to continue to pass through their town. Transit NZ, which manages the road, requires that if a state highway is affected by a development such as this, the road must be made good at no cost to Transit. Detailed assessment of the costs and feasibility of rebuilding SH77 or upgrading Downs Road will be included as part of Central Plains Water's final report to the two sponsoring Councils.

**Q. What compensation will property owners receive if their land is inundated by the reservoir or intersected by canals?**

**A.** Any decisions about compensation and land acquisition will be made after the feasibility study – and assuming the project is still viable. Decisions on land purchase will be made at that point by the two sponsoring Councils, following completion of the feasibility study.

**Q. What do the proposals mean for the Selwyn River?**

**A.** A community scheme ought to help improve Selwyn River flows, if those irrigating from the river or its margins switch to scheme water. Under the scheme for consultation published in August, the options for taking the water out of the proposed Wairiri Reservoir into the level headrace are:

- In a canal alongside the Selwyn, with a part of the river re-directed.
- In an outlet channel which would be buried under the Selwyn.
- Through a two km tunnel under the Harper Hills.
- In a canal to the north of Glentunnel. Consultation with various stakeholders will help determine which of these options – if any – is most acceptable.



A dry stretch of downstream Selwyn River – opportunity for enhancement

## Government Preparing Water Use Policy

The Ministry of Agriculture is preparing a policy on water use – specifically on the government's role in large-scale, community-initiated water enhancement and irrigation. Agriculture Minister Jim Sutton announced in September that MAF was to commission five studies. When completed these will form

the basis of a strategic policy position. Such a position would guide regional development plans and long-range water allocation. Scheduled for completion by the end of February, the studies will cover the following:

- A review of international models and experiences,

- A review of equity investment options,
  - The role of central government,
  - The role of local government, and
  - Economy of previous irrigation investments.
- Further government work will follow these studies, with decisions next April.



*Rob Lawrence is practice manager of the Darfield-Malvern Farmers' Veterinary Club, retiring chair of the Darfield Community Committee and a recently elected member of the Malvern Area Community Board – Hawkins Community.*

“People around Glentunnel and Coalgate are concerned about what might happen to their communities if a reservoir is built. I understand why they are worried, and their concerns must be dealt with properly – but we also need to keep the greater good in mind.

Water is the key for any agricultural enterprise on the Plains. If the economic projections are correct, and a scheme goes ahead, Darfield – along with Malvern – will surely benefit.

If 4,000 new jobs are created from irrigating 84,000 hectares, maybe ten per cent of the people who take those jobs might choose to live in Darfield. That's 400 new people, plus their families, all needing homes to live in, somewhere to do the shopping, schools, doctors and so on. That will have a big impact on this town. Is the Darfield town water supply capable of serving all those extra people, for example?

We need to start planning now for the event – if it goes ahead – so that when the water is turned on, the townships are able to cope.

## Employment follows irrigation in Waimakariri

According to a recent farmer survey by Waimakariri Irrigation Ltd, some 105 jobs have been created on irrigated farms after two seasons of the scheme that operates between the Waimakariri and Ashley Rivers. Off-farm – in processing, production and support industries – up to 350 new jobs will be created as a result of the scheme, which can irrigate 14,000 hectares.

Survey estimates say on-farm developments due to irrigation have seen \$85 million invested in the district over the past two years.

Around 43 per cent of the water expected to be used in this irrigation season will be for dairying, while 28 per cent will be split between large scale fattening or finishing properties, intensive arable farming and horticulture.

Waimakariri dairying has burgeoned since the scheme began. Two years ago the district had six dairy farms with about 1,400 cows. Since then nine farms have converted with another eight coming on-stream. A total of about 12,600 additional dairy cows will then be grazing the district, representing a gross annual income for these farms of about \$24 million.

Two major animal fattening projects are also in development, plus others focused on intensive arable. According to the survey the five or six larger arable properties are estimated to gross approximately \$17 million this season.



Dairying – reliant on irrigation and an important driver of rural economic growth

## Big gains indicated for small towns

Small towns bear the brunt of droughts – and stand to gain the most from irrigation, according to recent studies of the agricultural economy.

In 1999 Agriculture New Zealand carried out a survey of 269 Canterbury farmers to determine the impact of the 1997–99 drought.

This showed farmers tend to spend close to home. Because of its large total expenditure, an average dairy farm spends twice as much through small towns as an average arable farm, which itself spends two and a half times as much through small towns as an average dryland pastoral farm.

A November 2000 social and economic impact study concluded a water enhancement scheme irrigating 84,000 hectares could result in up to 4,000 jobs and generate \$600 million per annum in the Canterbury regional economy, of which \$400 million would benefit the off-farm community.

If a community scheme proceeds, land use change from dryland to dairy and arable is likely. The spending patterns detected by MAF suggest Rolleston and Darfield will particularly benefit.

The 1997–99 drought is estimated to have cost farmers \$231 million with a total net impact on the Canterbury economy of \$280 million, spread over three years. The survey findings suggest in a drought period farmers borrow more, run down savings and reduce wages, maintenance and development. These operational reductions are more likely to affect small towns.

Technical reports from the MAF surveys can be read at [www.maf.govt.nz/mafnet/publications/techpap.html](http://www.maf.govt.nz/mafnet/publications/techpap.html).

# water update

NOVEMBER 2001



**The Central Plains Water Enhancement Steering Committee was set up by Christchurch City and Selwyn District Councils in March 2000 to investigate ways to improve the security and prosperity of the Central Canterbury region through water management schemes that enhance ecological and recreational values while providing opportunity for agricultural and horticultural diversity. Requests for further copies, previous issues and all other enquiries about the content of this newsletter should be directed to Central Plains Water project manager Eddie Thomas, tel (03) 963 1748. More information on [www.cpw.org.nz](http://www.cpw.org.nz)**



## 'Green Warrant of Fitness' proposed for water users

Suggestions have been made through Central Plains Water's consultation programme that an environmental audit should be carried out on any farm seeking to irrigate from the proposed community scheme. Such a 'Green Warrant of Fitness' system would help ensure that the changes in land use likely to follow from irrigation do not lead to environmental problems. The theory behind this is that if land use change is unchecked, it can lead to degradation of groundwater and surface water through faecal and nitrate contamination.

Dairy farmers were recently provided with a set of environmental and animal welfare guidelines prepared to help ensure the industry lives up to New Zealand's 'clean, green' image.

Published by the Dairy Board, the voluntary guidelines are designed to help farmers improve their own systems, including management of effluent, water, fertiliser, waste, soil, pesticides and agrichemicals.

If the use of water from the scheme Central Plains Water is investigating depends on an environmental audit system, the 'Green Warrant of Fitness' is likely to cover the same areas.



Riparian planting and fencing – environmentally aware land use

## Recreation opportunities on reservoir

Jet-skiing, kayaking, windsurfing and even swimming should be possible on the proposed Wairiri Reservoir – but establishing it as a fishery in the initial years is not recommended.

A report for Central Plains Water by the National Institute of Water and Atmospheric Research (NIWA) shows that for much of the time the reservoir would be full.

Based on figures from the last 28 years, it would only have dropped below half full on six occasions – usually during March and April. However, in two of the 28 years, the reservoir would go completely dry.

Apart from these times, at ten square kilometres and average depth of 25 metres, it is likely that the reservoir will be able to be used for a variety of sports and leisure activities.

Until the organic matter at the bottom of the reservoir decomposes, the quality of the water may make it unappealing. Once this process is completed, probably after two years, the quality of the reservoir water should make it an inviting place to play.

Assuming Rakaia and Waimakariri water will be stored in the reservoir, it will be relatively turbid, and therefore not particularly well suited for trout and angling. However, once the period of organic decomposition and low oxygen levels in the deeper water becomes less critical, it may be possible to trial the reservoir as a fishery by stocking it with trout.

