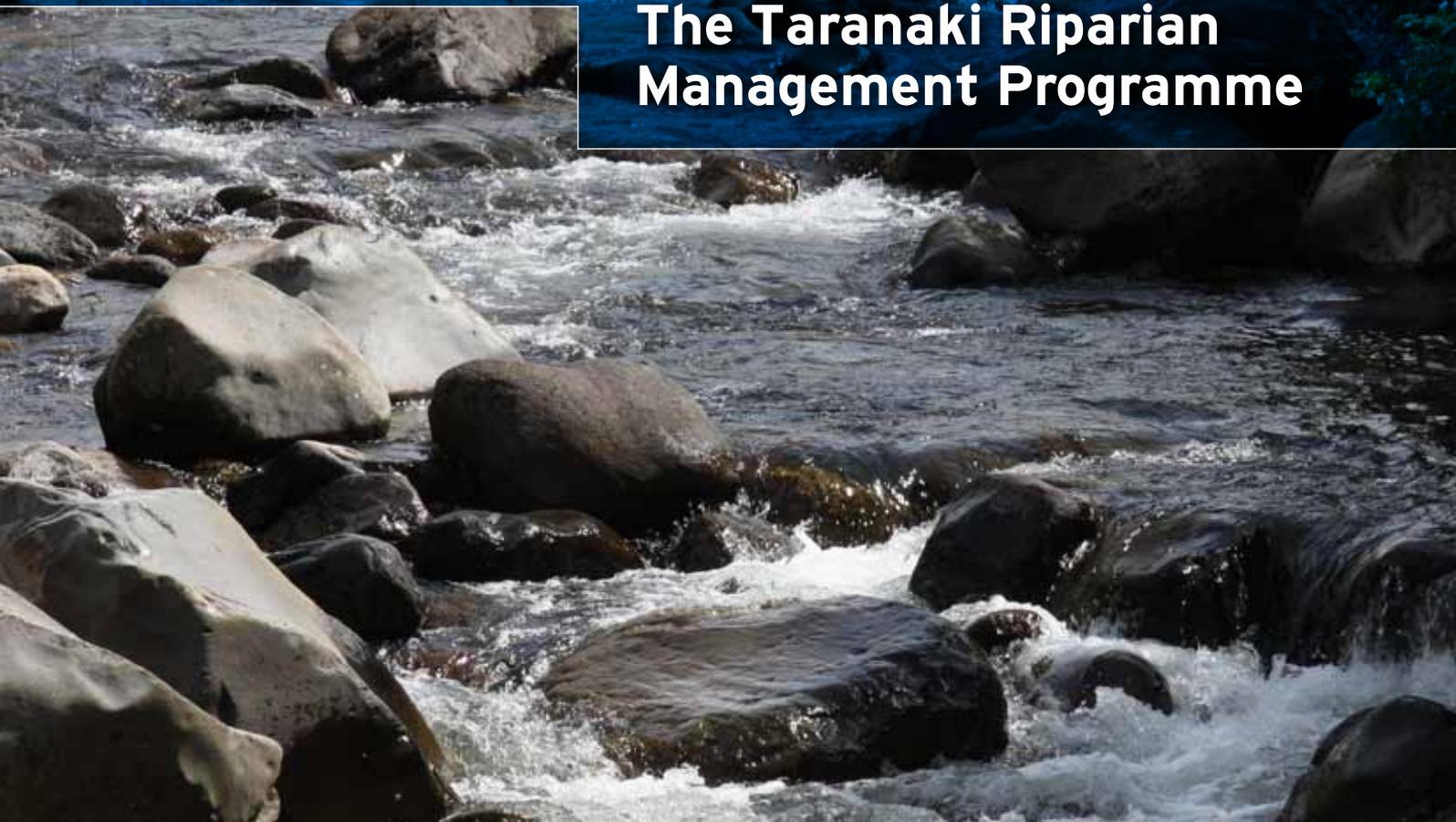




TRANSFORMING TARANAKI



The Taranaki Riparian Management Programme





The Government is working hard to build the foundations for a stronger economy. Our export industries, including the dairy industry, have a huge role to play in this. We need to work together to balance our environmental responsibilities with our economic opportunities. Congratulations to the Taranaki Regional Council for leading this Riparian Management Programme, and to all dairy farmers who are taking part so far. Thank you for your contribution to New Zealand's success.

PRIME MINISTER, RT HON JOHN KEY.





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INTRODUCTION



Taranaki fresh water – it is one of the region's greatest assets.

This publication is about a massive environmental project – the Taranaki Riparian Management Programme – that is transforming the Taranaki landscape.

It is a story about how farmers, with the encouragement of the Taranaki Regional Council and the dairy industry itself, are becoming better guardians of the environment by working to reduce the amount of diffuse-source pollution going into the region's rivers and streams – the material that is washing off pastures and into waterways.

This publication describes the Riparian Management Programme and its successes so far. Not only does it detail how the Programme operates, it also provides the latest information from both this country and overseas that underlies the benefits of retiring riparian margins.

A notable feature of this Riparian Management Programme is that there is no regulatory requirement for farmers to fence and plant their riparian margins. Notwithstanding that, the farming community is getting with the Programme in a serious way.

In what is believed to be the largest environmental enhancement planting scheme on privately owned land in New Zealand, Taranaki farmers are fencing off land on both sides of the streams that flow through their properties, and planting them with vegetation. In so doing, stock access and the fouling of water by dung and urine from stock are prevented, while the riparian planting helps to trap and filter pasture run-off, provides shading, and generally improves water quality.



Farmers are becoming better guardians of the environment by working to reduce the amount of diffuse-source pollution going into the region's rivers and streams – the material that is washing off pastures and into waterways.

DAVID MACLEOD, CHAIR, TARANAKI REGIONAL COUNCIL.

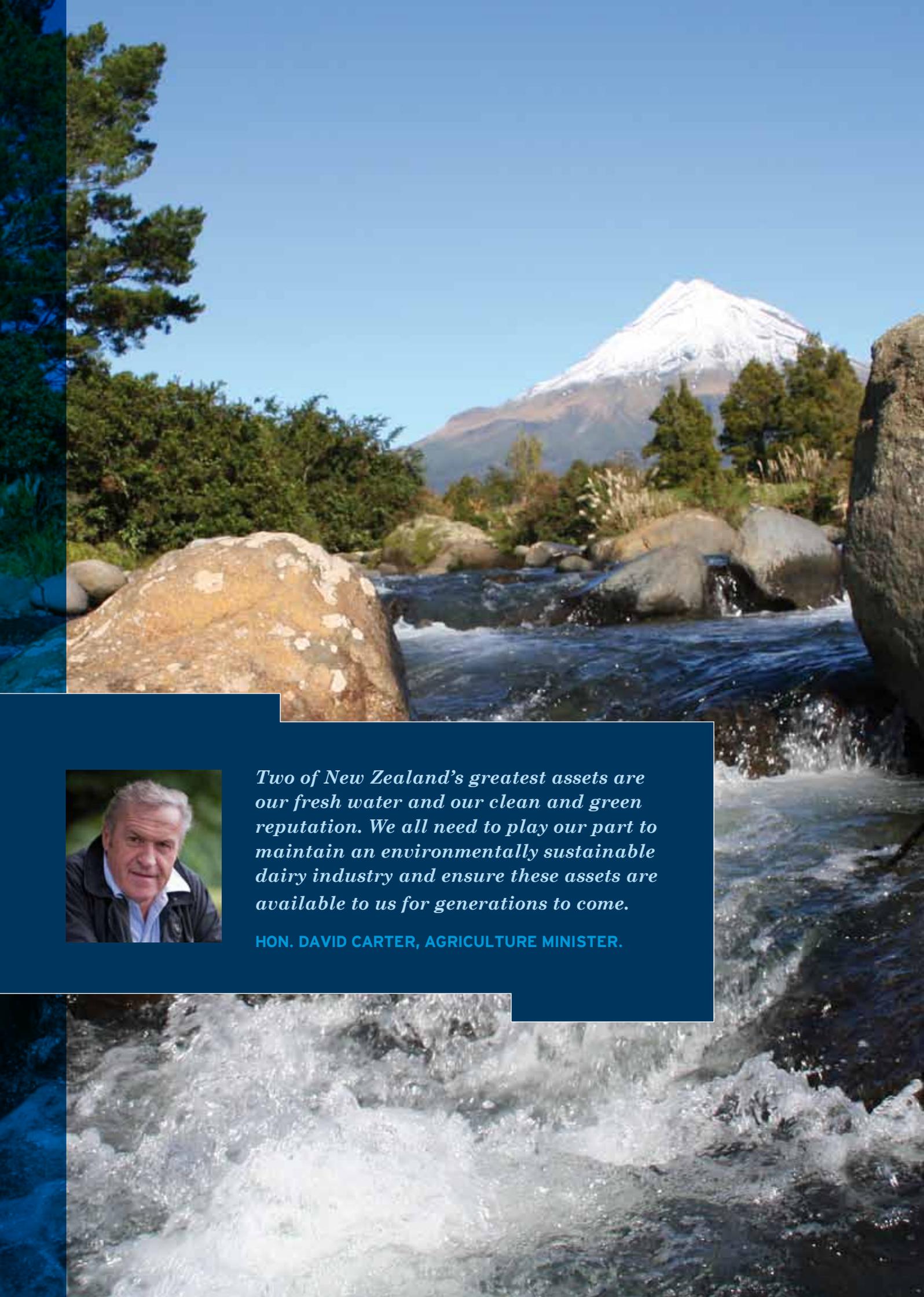
This publication gives a comprehensive update on the progress of this magnificent, totally voluntary, award-winning environmental initiative. We're sure you will be impressed by:

- The collaborative response adopted by the Taranaki Regional Council, the farmers, and their industry to addressing the effects of diffuse-source pollution on Taranaki waterways.
 - The sheer size of the Riparian Management Programme. The Programme, which is international in scale, has so far involved the preparation of more than 2360 plans with property specific advice on riparian fencing and planting. These plans cover 96 per cent of all Taranaki dairy farms and almost all of the ring plain and coastal terraces.
 - The voluntary investment being made by farmers. It's about good people being proactive and doing the right thing by carrying out work to reduce the impact of their businesses on the environment – in this case, water quality. So far the implementation of riparian plans has resulted in more than 1900 kilometres of new fencing, and the planting of more than two million native plants.
 - The innovative and adaptive nature of the Programme. The Programme, and its application, involves leading-edge Geographic Information System (GIS) technology. Over time we have become smarter, faster and more accurate with what we are able to do in terms of preparing plans and monitoring their implementation.
- The science confirming the environmental and long-term economic benefits of fencing off and planting along our rivers and streams – as underscored by the results of an increasing number of local, national and international studies.

Taranaki's farmers are to be congratulated for their progress made so far on fencing and planting our rivers and streams. However, more needs to be done to speed up the fencing and planting of our streambanks. Let us build on the Riparian Management Programme's momentum. The Taranaki Regional Council has and will continue to support farmers to do this. Please be part of this success.

If you require any further information, please contact us (see inside back cover). We would be delighted to assist.

David MacLeod
Chair
Taranaki Regional Council



Two of New Zealand's greatest assets are our fresh water and our clean and green reputation. We all need to play our part to maintain an environmentally sustainable dairy industry and ensure these assets are available to us for generations to come.

HON. DAVID CARTER, AGRICULTURE MINISTER.

WHAT'S THE ISSUE?

Taranaki is pastoral country, a patchwork of green fields on the ring plain surrounding Mount Taranaki which lies in the Egmont National Park.

As global demand for dairy products increases, so the industry is intensifying, with the number of cows grazing on every hectare of dairy land now ranging from one to five.

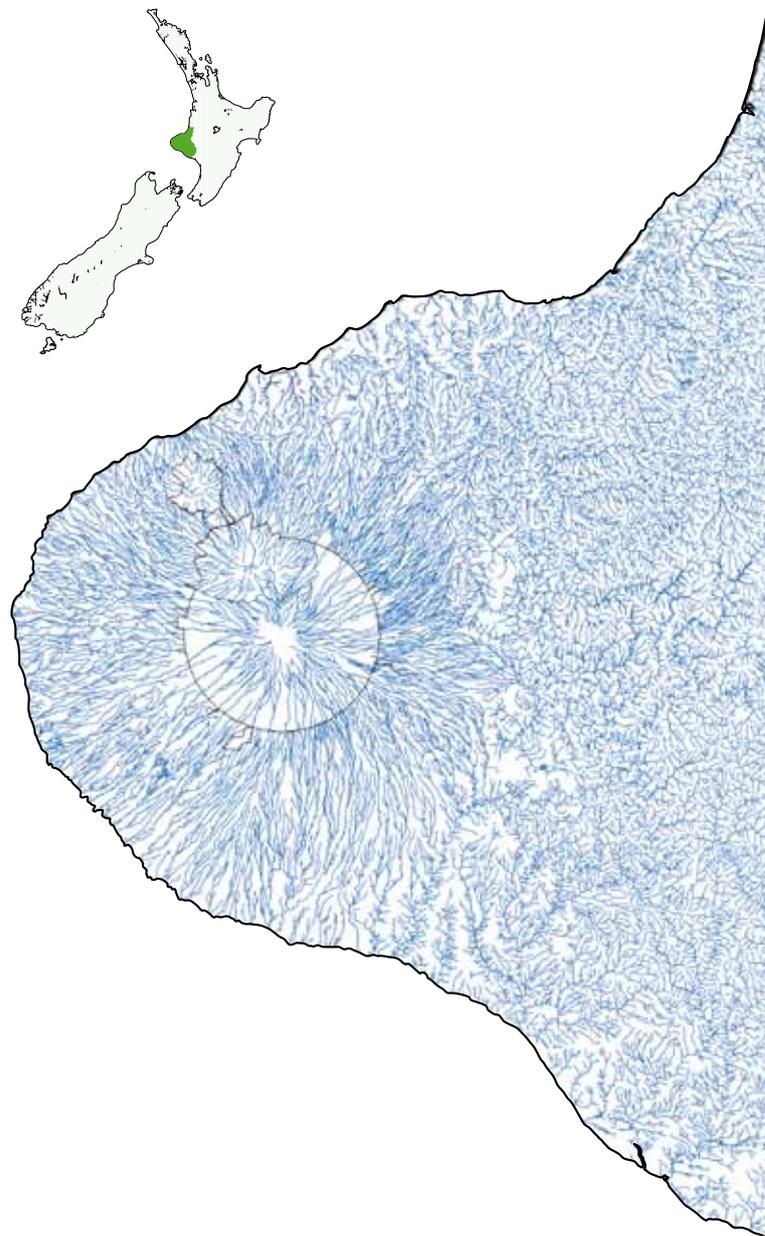
It goes without saying that considerable amounts of dung and urine are received by Taranaki's dairying pasture each day. In addition, modern-day intensive farming practices can involve large amounts of fertilisers, as well as pesticides and herbicides, being applied to the pastures.

All this increases the potential for what is known as diffuse pollution – organic wastes, bacteria and nutrients entering rivers and streams, particularly when it rains.

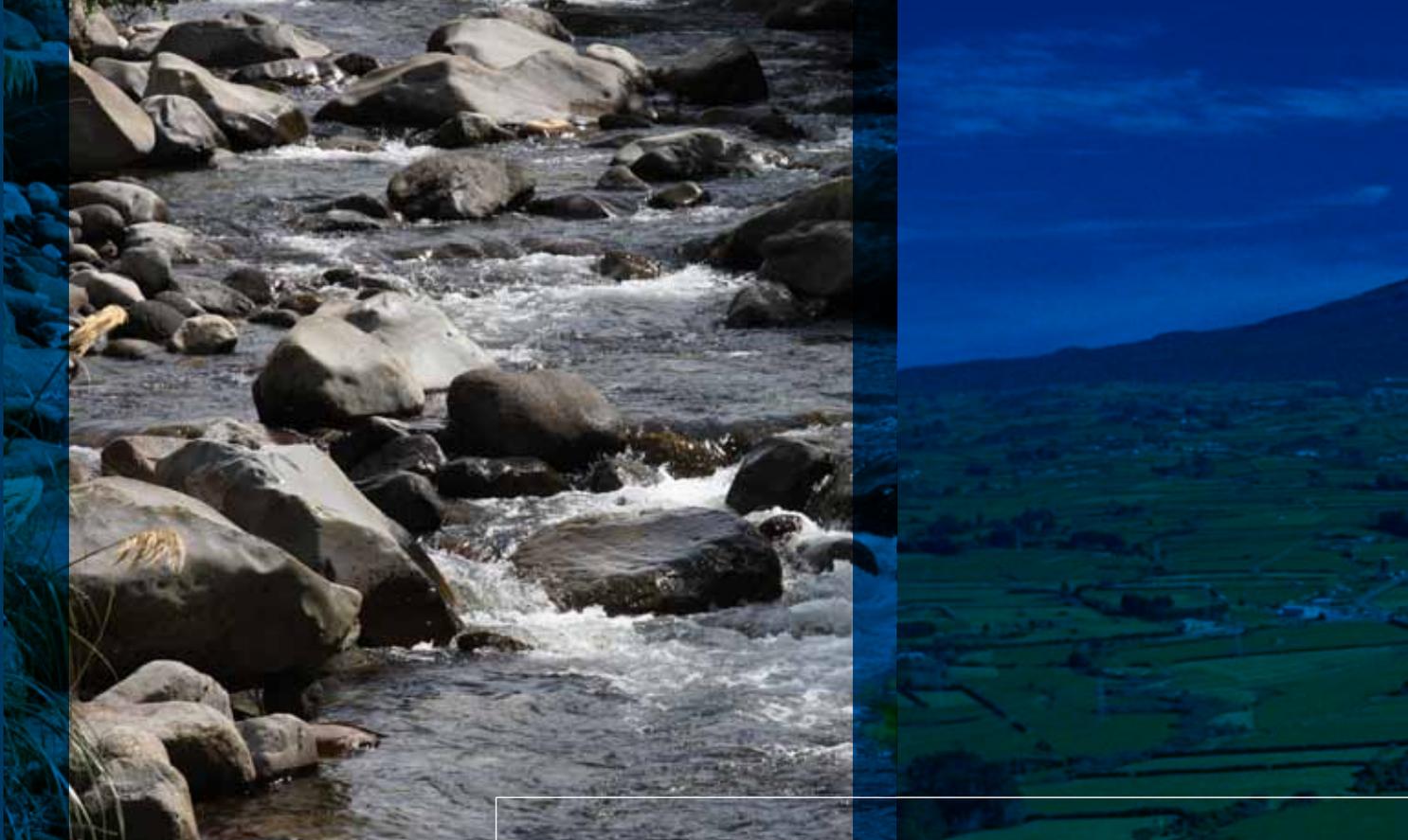
More than 300 rivers and streams, with a total length of 7330 kilometres, drain from the mountain to the sea. This equates to a total length of 14,660 kilometres of streambank, which is about the same as the length of the entire New Zealand coastline.

The 813 kilometres of rivers and streams flowing through the Egmont National Park have their original riparian vegetation. Below the National Park, however, lies the ring plain where much of the original riparian vegetation has been cleared.

The ring plain is one of the world's most intensive dairy farming areas. The total length of rivers and streams traversing the ring plain is 6517 kilometres, with almost every dairy farm having at least one stream dissecting it.



< More than 300 rivers and streams, including the Waiwhakaiho River in North Taranaki, tumble down from Mount Taranaki to the sea.



What's wrong with nutrients in streams?

Nutrients, including the elements nitrogen and phosphorus, are essential for plant growth and soil biological activity. On land or of themselves, nutrients are not a problem (only rarely will the concentration of nutrients be such that it will result in ammonia toxicity). The problem with excessive nutrient enrichment is how the nutrients may affect the physicochemical and biological condition of water once they escape or seep into our waterways.

Nutrient contamination results from point and non-point (diffuse) source discharges to water and is strongly associated with intensive land use. As a general rule, high levels of nitrogen and phosphorus, in particular, contribute to the excessive (nuisance) growth of plants, including algae, which, in turn, can smother the instream habitat, affect the attractiveness of water for swimming or as a habitat for fish, impede water flows and block water intakes.

Nuisance impacts on water quality vary across the country according to topography. The growth of nuisance aquatic weeds and algae in water can lead to eutrophication, whereby adverse fluctuations in dissolved oxygen and pH result in reduced water clarity and oxygen depletion. This is especially an issue for lakes and streams with retention structures.

Fortunately, nutrients are not such a problem in Taranaki, as in other parts of the country or internationally, because of our fast flowing rivers and streams. Frequent flushing events in our rivers and streams – thanks to plentiful rainfall – provide natural scouring. Even in summer, our rivers do not have the large bodies of shallow sluggish warm flows along their length, which would be conducive to the growth of nuisance aquatic weeds and algae.



Over the past 170 years much of Taranaki's bush cover has been removed as the region has developed into one of the world's premier dairying areas.

The people of Taranaki value their fresh water. Their rivers and streams are essential to life in the region – culturally and aesthetically, for drinking and community supply, as a food source, for recreation and leisure, for agriculture, and in more recent years for industry and commerce.

But as the region has progressed, so its mountain-sourced supply of fresh water has come under pressure. Not only are greater quantities of water being taken out of the rivers and streams to meet modern-day demands of industry and agriculture and for domestic use, but pressure has also been placed on the quality of the water.

No natural water is ever absolutely pure. But it is a fact that the water that emerges from the boundary of the bush-covered Egmont National Park is world-class. It is clear and healthy.

In pre-European times, Taranaki's fresh water would have largely remained that way as it rushed down the river and stream channels to the sea, because it had almost total bush cover to protect it.

However, over the past 170 years much of the bush cover on the intensively farmed areas of Taranaki disappeared as the region developed into one of the world's premier

dairying regions. This included vegetation along the edge of the rivers and streams, leaving the waterways vulnerable to erosion, flooding, lack of shade, and pollution caused by the run-off of animal waste and fertilisers.

An aerial survey of 25 ring plain streams in 1995 showed that about 60 per cent of their total length from Egmont National Park to the coast was lacking any form of riparian vegetation – with most of the clearance in the mid to lower reaches of the streams where protection was most needed. Many waterways were also not fenced, meaning there was little to stop cattle entering and polluting streams.

Maintaining or improving water quality is important not just for domestic, farm or community water supplies. It is also important for maintaining the natural character, ecological, amenity and recreational values of Taranaki rivers and streams, and the cultural and spiritual values of or customary uses by tangata whenua.

Under the Resource Management Act 1991, the Taranaki Regional Council is required to report every five years on the state of Taranaki's environment. To meet this requirement the Council regularly monitors water quality in rivers and streams throughout the region.



Taranaki is dairy farming country, with a cow population of 480,000. Pictured is the Faull's farm at Tikorangi in North Taranaki.

The importance of dairying

Dairying makes a significant contribution to New Zealand's economic and social wellbeing – dairy exports in 2008/2009 were worth \$10 billion to the nation, which represents about 25 per cent of total merchandise export earnings.

New Zealand produces about two per cent of total world milk production at around 16 billion litres per annum but, unlike most other countries, it exports around 95 per cent of its dairy produce.

Taranaki is one of New Zealand's leading dairying regions, with dairying the dominant agriculture on the ring plain that surrounds Mount Taranaki.

There are 1760 dairy herds in Taranaki, which is about 15 per cent of all such herds in New Zealand, and the dairy cow population is 480,000.

While this monitoring programme quickly established that water quality in Taranaki is generally good overall, it also shows the cumulative effects of the diffuse pollution and how it is contributing significantly to progressive declines in various water quality indicators down each river's course.

Fresh water, and the management of its quality, is increasingly becoming a major environmental issue in New Zealand, and in the future this may lead to introduction of national regulations by central government.

But thanks to the can-do attitude that Taranaki is renowned for, this region is already well on the way to overcoming the water quality and diffuse-source management issues through its Riparian Management Programme.



Taranaki's population of dairy cows is estimated at 480,000 and it has doubled over the last 50 years. They graze on about 290,000 hectares of land. It is estimated that more than 92 per cent of each cow's waste goes onto pastures and farm races, and only the remaining 8 per cent in dairy shed yards where discharges can be controlled.

THE PROGRAMME

The secret is buy-in from Taranaki's farmers and the community

In the early 1990s the Taranaki Regional Council went to its community with a big idea – a forward-thinking initiative aimed at encouraging the region's farmers to 'retire' riparian margins.

By any reasonable comparison, Taranaki does not have a major water quality problem. Our water quality is relatively and actually good. However, the Taranaki Regional Council was interested in canvassing the views of its community on how it could best respond to a few negative trends in some water quality parameters to maintain and in some cases improve good water quality, while at the same time allowing the region's dairy industry to grow and prosper.

Options canvassed included regulation, but following public submissions on the discussion document, the Council adopted a Strategy and a non-regulatory approach that has since evolved into the Taranaki Riparian Management Programme.

Subsequent consultation, undertaken as part of Regional Policy Statement for Taranaki (1994 and 2010) and the Regional Fresh Water Plan for Taranaki (2001), has confirmed community and farmer support for the Programme.

A massive environmental effort

In what is believed to be the largest enhancement planting scheme on private land in New Zealand, the Taranaki Riparian Management Programme is transforming the landscape by supporting the region's farmers to retire riparian margins on either side of the waterways on their



properties by fencing them off and planting them with suitable vegetation.

It's a massive environmental effort. So far it has seen the Taranaki Regional Council prepare more than 2360 riparian plans for farmers covering the region's most intensively farmed land. It covers not only the ring plain but also the region's northern and southern coastal terraces. Hundreds of kilometres of streambanks have been fenced off, and more than two million plants have already been supplied to the farmers concerned.

Naturally there is a financial cost involved in this initiative - to both the farmer and the wider community. But the encouraging news is that the Riparian Management Programme has now progressed to the stage where, for many individual farmers, the cost of establishing and maintaining their riparian zones is a normal part of farm budgeting, alongside such other essentials as fertiliser application and repairs and maintenance.

Taranaki's ratepayers are contributing to the big effort too. Taranaki Regional Council support for the Riparian Management Programme costs around \$1 million of rates each year in recognition of the wider public benefits derived from efforts to maintain or improve the region's water quality.



As an innovative and sustainable industry, commitment to the Taranaki Riparian Management Programme is vital to ensuring the future of the dairy industry in Taranaki.

**SIR HENRY VAN DER HEYDEN,
CHAIRPERSON OF FONTERRA.**





A family affair – South Taranaki farmer Kevin Murphy with grand-daughters Bethany and Tessa (on ute) and Isabelle and Simone, help Mr Murphy's daughter Catherine (left) and depot worker Trish McDonald (right) load riparian plants at Opunake.

Collaboration turns plans into plants

A notable feature of the Taranaki Riparian Management Programme is that there is no regulatory requirement for farmers to participate – instead, they are encouraged to do so through the preparation of property-specific riparian plans, access to bulk purchased low-cost riparian plants, and the provision of ongoing advice and assistance.

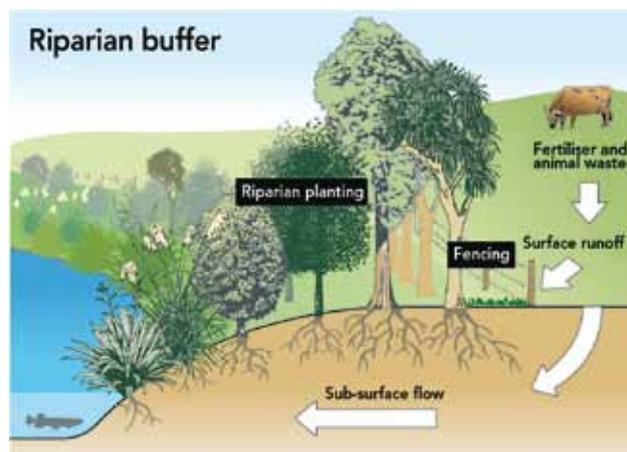
Another notable feature is a 'one-on-one' approach whereby a Taranaki Regional Council land management officer works with individual farmers to determine what is required to address the riparian needs for that particular farm.

The encouragement begins with the Taranaki Regional Council offering to prepare a riparian plan for an individual farm owner, free of charge. Preparation of the plan involves one of the Council's land management officers walking over the farm to obtain a first-hand idea of what needs to be done, and then producing a property-specific plan outlining fencing and planting recommendations, what it will cost, and how it can be incorporated into the farm's operations and budget.

These A3-sized plans feature on one side an aerial map of the property containing Geographic Information System (GIS) layers highlighting fencing and planting recommendations, with the reverse side consisting of a series of planning and budgeting tables. The tables outline a schedule of the timing of the works, calculation

of the costs for different stages of the fencing and planting programme, and a list of suitable plant species that can be planted.

Complementing the planning service is provision of native riparian plants at wholesale cost to plan holders. This is a major feature of the Riparian Management Programme whereby the Council purchases bulk supplies of plants from various plant nurseries through a tendering system, and then supplies these plants at cost to the riparian plan holders. Thanks to this bulk supply arrangement, the plant prices are able to be kept down to an average of less than \$3 each, depending on type and size, meaning a saving of approximately \$1 to \$2 per plant.





The Riparian Management Programme's strength has always been the voluntary approach the Taranaki Regional Council has taken. What I'm now seeing is that most farmers are recognising riparian fencing and planting as part of their day-to-day business of dairy farming, and they are scheduling the work into their annual budgets and work programmes. This underlines the value of the Council's one-on-one approach with individual farmers.

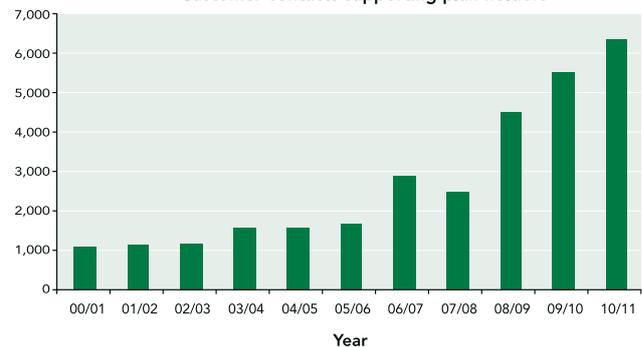
DEREK GIBSON, TARANAKI FEDERATED FARMERS DAIRY SECTION CHAIRMAN.

Many farmers prefer to pay contractors to fence and plant their riparian margins. Where this is the case, the Council will, on behalf of individual farmers, organise professional contractors to plant the riparian margins. The Council tenders for planting contracts, and by doing this is able to ensure the quality of plantings, obtain the best prices and pass on these savings to the farmers. This is particularly useful for first-time riparian planters and helps to ensure the successful establishment of plants.

Once the plan to establish the riparian zone has been produced, the Council's land management officers remain in regular contact with individual farmers to assist their progress with fencing and planting, provide ongoing advice and encouragement, and to take orders for further plants through the bulk supply scheme.

This ongoing liaison is significant and has added importance, as the Council's focus has now shifted from the preparation of riparian plans, to promoting and supporting their implementation. For example, in 2010/2011, land management officers contacted and provided supplementary advice to farmers on more than 6300 occasions. Land management officers endeavour to visit plan holders annually to record and map implemented works, to provide further on-site advice, and to take plant orders for the following winter.

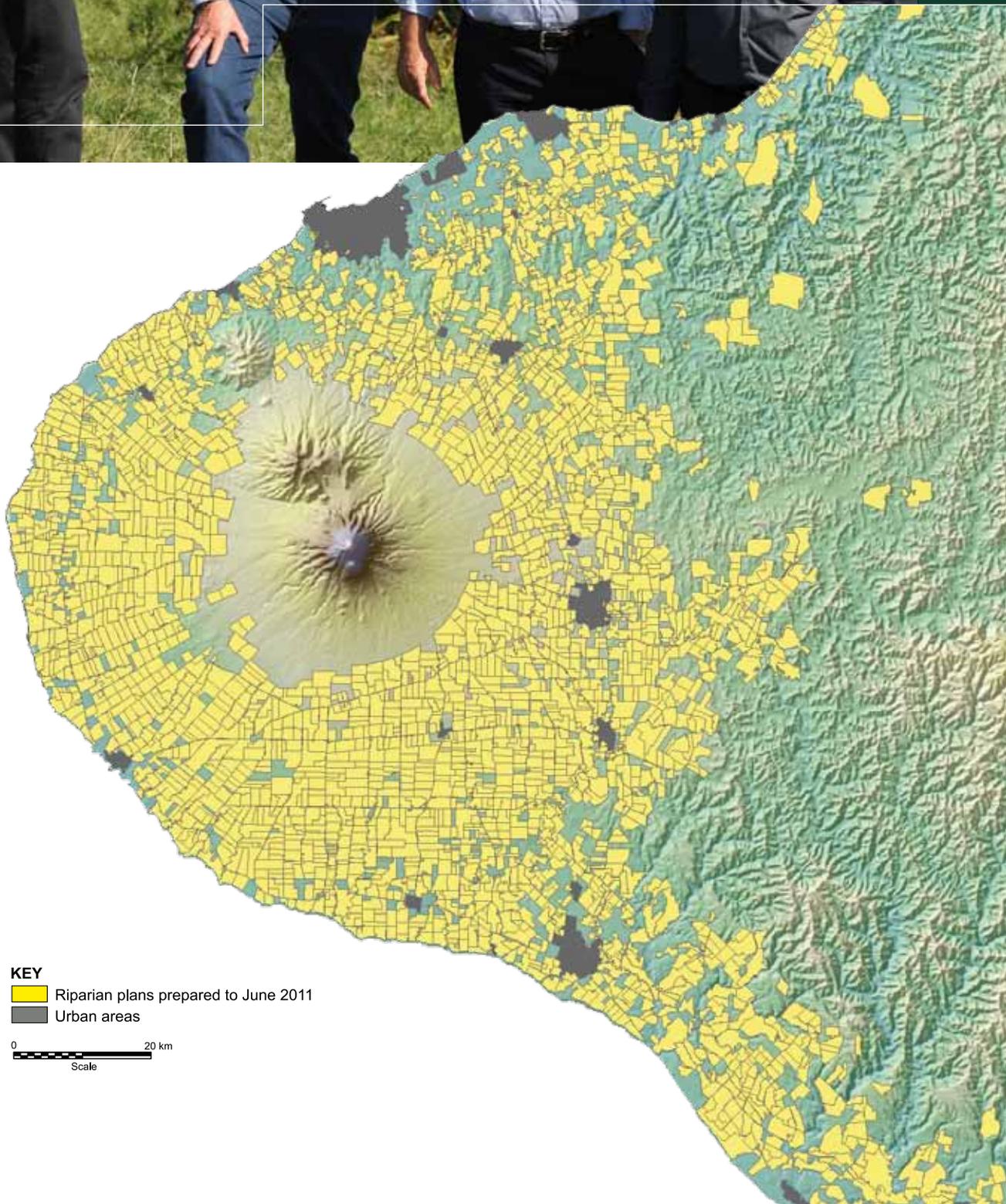
Customer contacts supporting plan holders



The Taranaki Regional Council riparian plant nursery near Lepperton.

TOP RIGHT:

The Taranaki Rugby Union operates a dairy farm on a property in South Taranaki. From left, Taranaki Community Rugby Trust farm advisor Michael Joyce, Origin Energy operations manager Gary Rooks, Trust chairman Ray Barron, and All Blacks coach Graham Henry discuss the farm's riparian management.





Taranaki Regional Council GIS officer Melanie Candy busy updating a riparian plan.

Innovative and leading-edge tools

The Taranaki Riparian Management Programme has evolved considerably over time, all the time making heavy use of new and leading-edge technology.

Since 2001, Taranaki Regional Council officers have been preparing riparian plans using what are known as ArcGIS (ArcView) applications.

Pre-GIS the preparation of riparian maps and plans was a slow and laborious process. However, to achieve Council objectives for water quality, there was a need to increase the number of riparian plans prepared. To provide for this increased capacity the Council invested in GIS, and up-skilled staff to use the technology.

The benefits are self-evident. From 1993 to 2001 the Council prepared 279 riparian plans. But from 2001 to 2011 – post-GIS – over 2000 riparian plans have been prepared.

GIS has resulted in a quicker and more automated planning process. The Council adopted a new GIS-based riparian plan format and the time required to prepare a plan was reduced from three days to one day. This, in turn, meant that the Council could now prepare about 350 riparian plans a year.

However, Council's increased capacity to prepare riparian plans far exceeded the demand for plans at that time. Therefore, the Council increased and became more proactive in its 'marketing' of riparian management to generate interest and demand for plans. The Council

began targeting and contacting all farmers in a selected catchment through correspondence and direct telephone contact. Over time, other catchments were targeted until the whole of the ring plain was covered.

Prior to GIS there was no cost-effective way of monitoring the implementation of plan recommendations, nor the actual amount of Council-supported tree planting. But now the Council is able to fully monitor and report on progress on the implementation of the plans at a property, catchment and regional scale.

Recently all this has been officially recognised, both nationally and internationally.

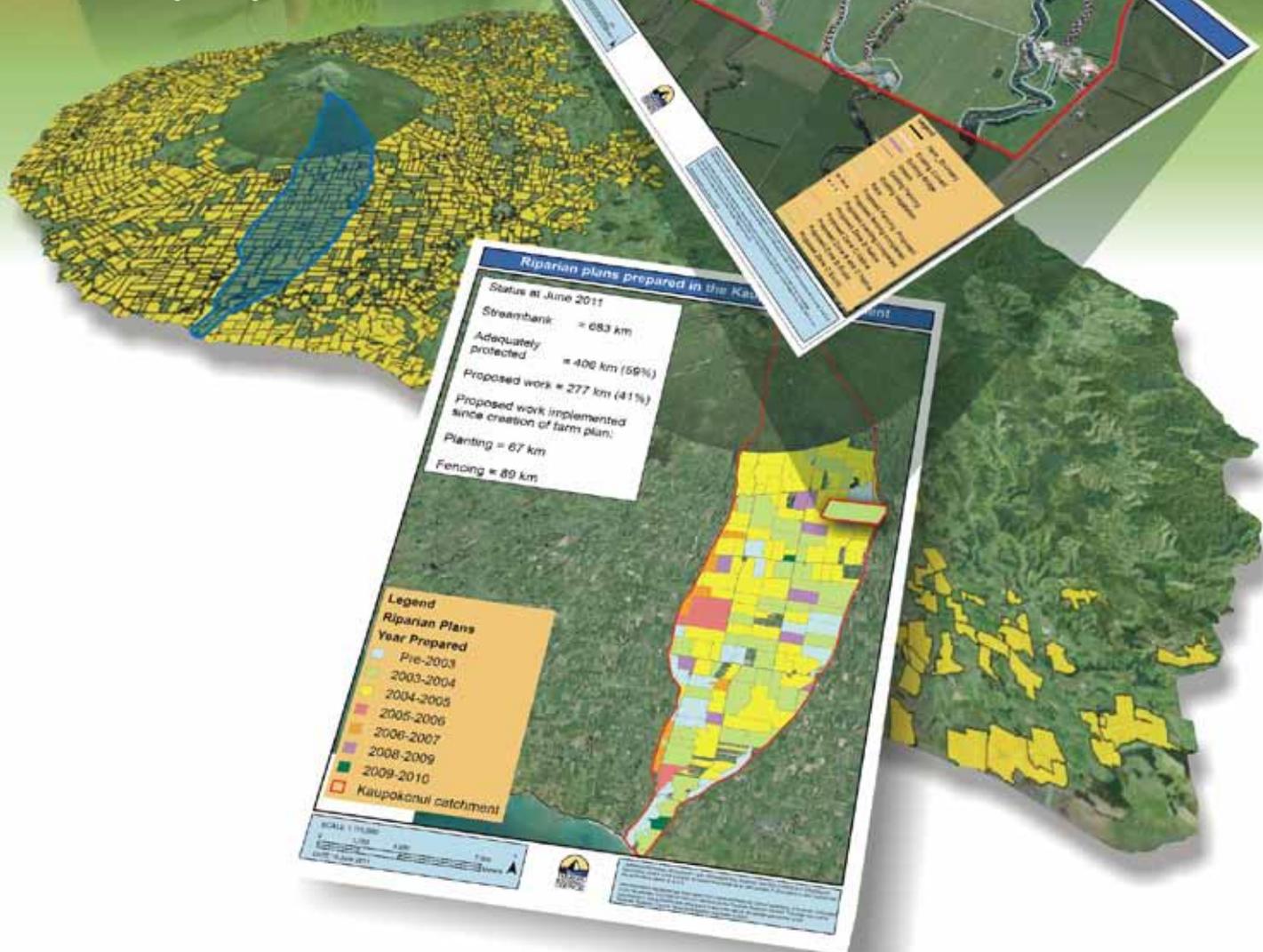
At the Geospatial World Forum 2011 in India in January, the Riparian Management Programme won an Excellence Award in the Land and Resources Management category.

At the New Zealand Resource Management Law Association Conference 2011, the Riparian Management Programme won the Association's annual project award. Awards convener Kate Barry-Piceno praised the Programme for showing "very clear problem definition, and a practical and collaborative response involving all stakeholders."

She added the Riparian Management Programme demonstrates considerable perseverance, and that the benefits of a long-term view and goal are tangible and measurable.



Taranaki Regional Council land management officer Darren Scown discusses a riparian plan with farmer Hanna Padrutt and her grand-daughter Martina.





Riparian protection is vital to Taranaki's dairy industry, and therefore its economy.

AN INDUSTRY VIEWPOINT

Riparian protection of Taranaki's rivers and streams is important not only to the health of the region's fresh water but to the health of the regional economy.

"Riparian planting is strongly supported by Fonterra as an effective way to protect water quality," notes Fonterra Chairperson, Henry van der Heyden. It is also vital to ensuring the future of the dairy industry in Taranaki.

Throughout the world, consumers are paying increasing attention to the issue of sustainability. They are demanding that right along the supply chain, producers and exporters are seen to be paying proper regard to the environment.

As a recently-published KPMG New Zealand paper on the subject points out, merely claiming that sustainable practices have occurred will soon not be enough. Rather, consumers and responsible retailers are demanding increased accountability and traceability in their suppliers' supply chain.

Does that opinion have relevance right down at a Taranaki dairy farmer's gate? Absolutely. As the concept of "pasture to plate" gathers momentum, a number of key on-farm issues will need to be addressed – including sustainable water use, water discharges, nutrient run-off, and waste treatment and disposal.

This view is supported by Fonterra Chairperson, Henry van der Heyden, who says, "New Zealand and Fonterra's access to international markets is based on a positive 'clean and green' image. This image needs to be underpinned by



environmentally responsible and sustainable actions at the producers' level."

He adds, "as an innovative and sustainable industry, commitment to the riparian programme is vital to ensuring the future of the dairy industry in Taranaki. The Taranaki Riparian Management Programme is an outstanding example of the dairy industry's commitment to addressing environmental issues."



South Taranaki dairy farmer Tom Gibson at a well-protected tributary of the Kaupokonui Stream.

A FARMER'S VIEWPOINT

South Taranaki dairy farmer Tom Gibson is a big fan of riparian management, for financial as well as environmental reasons.

Among the waterways running through Tom and Val Gibson's 100-hectare property are the upper reaches of an important Taranaki stream, the Kaupokonui. The Gibsons have been implementing a riparian plan along their streambanks for more than six years now, and there is plenty of proof of its success.

"I have found that the cost of planting has been a lot less than the cost of the stock I was losing," Mr Gibson says of his fencing and planting scheme.

"At calving time the cows would head for the streams, and often come down with milk fever. If you weren't there when they got up again, they'd get into the stream and either get bogged or drown," he says.

Liver fluke was another lurking peril for animals drinking from streams. Research has shown that cows drinking from reticulated troughs tend to walk less, eat more, and do better than cows drinking from streams.

For these reasons and more, Mr Gibson says riparian fencing and planting are an important farm asset and have made farm and stock management much easier.

He's also convinced that riparian buffers provide food and shelter for wildlife, and 'corridors' for birds. Streamside vegetation also reduces water temperatures and supplies food for aquatic insects that in turn provide food for fish.

Tom Gibson says Taranaki's rural land is among the most valuable in the world, and it needs to be treated as such.

"And it's the same with our waterways. We need to keep them as clean and pristine as possible."

"I have found that the cost of planting has been a lot less than the cost of the stock I was losing."



Taranaki dairy farmers have shown they are committed to protecting New Zealand’s environmental reputation. Congratulations to the large number of farmers who are participating in the Riparian Management Programme. To those that are not yet participating, I strongly encourage you to join the Programme.

HON. DAVID CARTER, AGRICULTURE MINISTER.

PLAN IMPLEMENTATION GATHERS MOMENTUM

Despite the fact it is entirely voluntary and represents significant investment by each farm property owner, the Taranaki Riparian Management Programme has gathered momentum to the extent that more than 2360 riparian plans have now been prepared for more than 96 per cent of all Taranaki dairy farms.

With riparian plans now covering 12,364 kilometres of streambank, we now know how much fencing and planting was in place at the time of plan preparation and know how much new fencing and planting is required to protect all our rivers and streams.

The map opposite illustrates Taranaki as something akin to a patchwork quilt.

It’s a highly significant illustration, because each of the patches represents a farm property that has had a riparian plan prepared by the Taranaki Regional Council. It also illustrates the degree of streambank protected by fencing and or riparian vegetation.

A significant length of streambank within the Riparian Management Programme was protected by existing fencing (6862 kilometres) and vegetation (4559 kilometres). However, there is a significant length of streambank remaining where fencing and planting is recommended under the 2360 riparian plans.

In terms of new fencing and planting, the riparian plans have collectively recommended 5502 kilometres of new fencing and 4919 kilometres of new plantings along streambank margins. This is a massive environmental project, at any scale, including nationally and internationally.

While it is relatively early days yet in terms of having all the riparian plans physically in place, significant and increasing progress is being made by farmers implementing the plans.

As at 1 July 2011, farmers have completed 35 per cent of their riparian plan recommendations relating to new fencing and 19 per cent of the recommendations relating to new plantings.

Riparian plan implementation – at a glance (as at 1 July 2011)

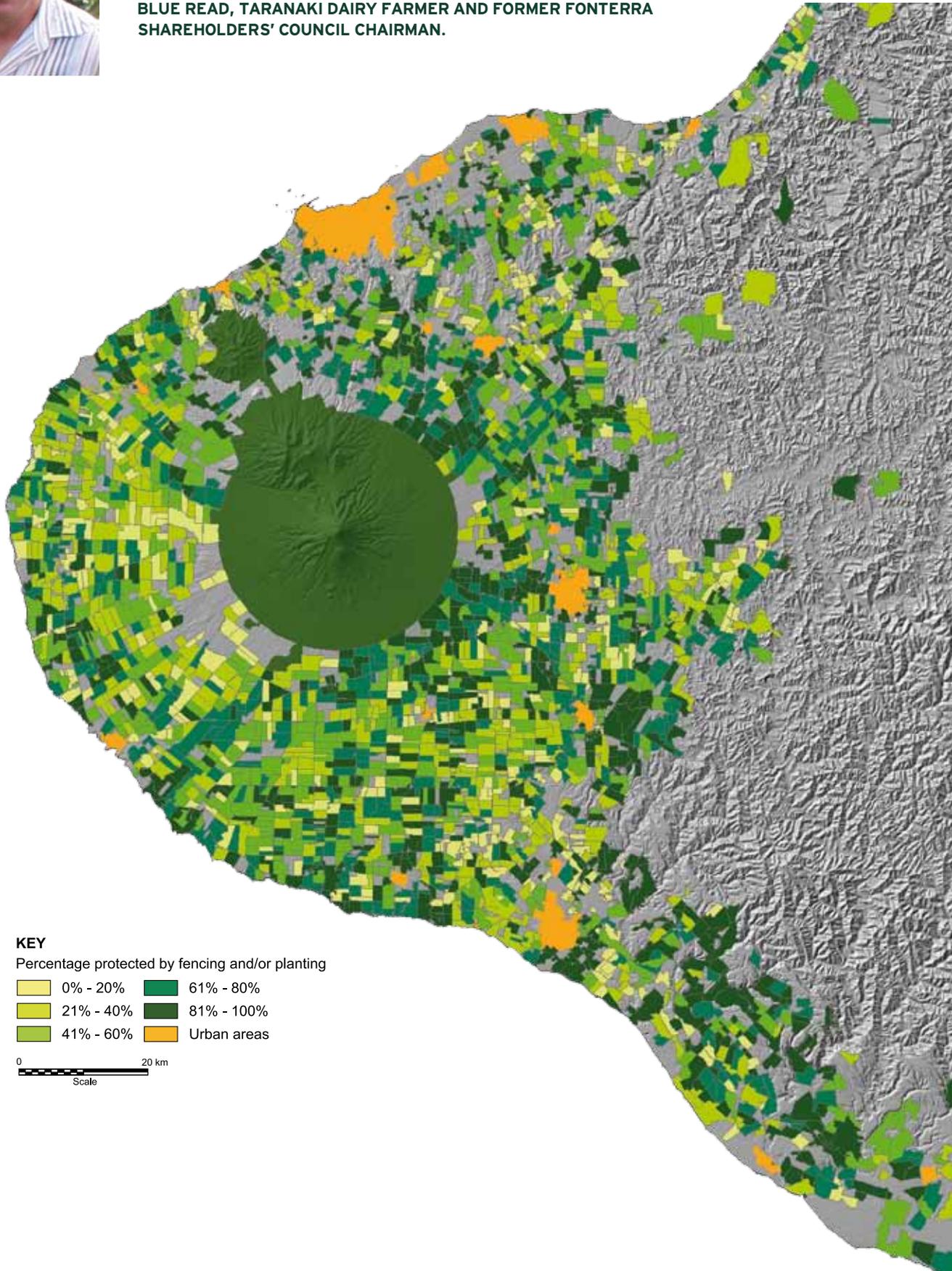
	Recommended fencing		Recommended planting	
	Km	%	Km	%
Works completed	1919	35%	930	19%
Works left to be done	3583	65%	3989	81%
Target*	5502	100%	4919	100%

*Total amount of works recommended in the 2360 riparian plans as being required to fence or plant riparian margins



We farmers can choose to be the heroes by getting on with doing it now, or we can be the villains and force the Taranaki Regional Council into a more regulatory enforcement attitude – it is our choice.

BLUE READ, TARANAKI DAIRY FARMER AND FORMER FONTERRA SHAREHOLDERS' COUNCIL CHAIRMAN.





Planting riparian vegetation alongside the Hutuwai Stream, North Taranaki.

What does this mean on the ground? Since the introduction of GIS in 2002, plan holders have fenced off 1919 kilometres of streambank and planted 930 kilometres of that length – a considerable amount of work.

If the fencing and planting in place at the time of plan preparation is taken into consideration, this means that so far almost 8800 kilometres of streambanks on the ring plain are now fenced, and almost 5500 kilometres of banks are now protected by either existing or newly-planted vegetation.

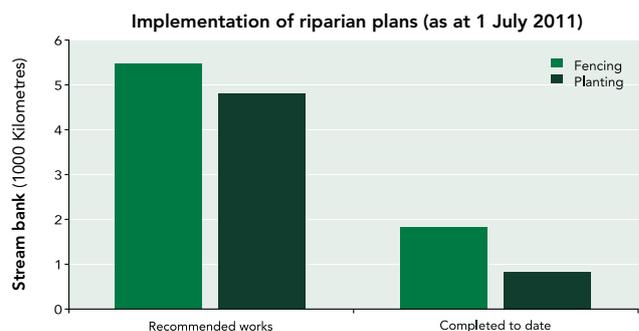
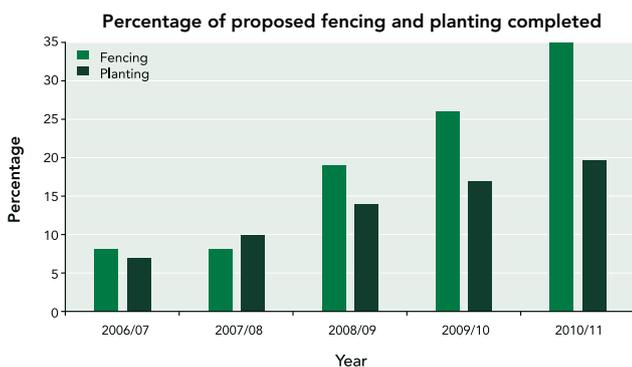
Put into percentage terms, these numbers mean that 71 per cent of stream banks originally identified by the Taranaki Regional Council as needing to be fenced are now protected by existing or new fences, and 58 per cent of streambanks are now vegetated by existing or newly-planted vegetation. Not all streambanks are necessarily required to be planted. Of the streambanks covered by

riparian plans, only 9,479 kilometres have been identified as needing to be protected by vegetation.

Since the mid-1990s, when the Riparian Management Programme started, the Council's native plant supply scheme has become the largest enhancement planting scheme on privately owned land in New Zealand. The 2011 planting season brought the number of plants supplied through the Council's native plant supply scheme to more than two million. In 2010/2011 alone, almost 330,000 riparian plants were sold to 900 plan holders.

A major influence in the large-scale acceptance of the Riparian Management Programme has been support from both the dairy industry and farmer organisations.

Seven years ago government organisations, unitary authorities, regional councils and dairy giant Fonterra combined forces to create the Dairying and Clean Streams Accord, a national initiative aimed at promoting sustainable





Riparian plants set out for collection at the Taranaki Regional Council's Lepperton nursery.

dairy farming by focusing on reducing the impacts of dairying on the quality of New Zealand's fresh water.

Several challenging national targets were set via this Accord. In Taranaki, the Taranaki Regional Council, Fonterra and Taranaki Federated Farmers immediately adapted these targets to local conditions and incorporated them into a Regional Action Plan for Taranaki. However, in addition to the national targets the Regional Action Plan had additional targets relating to the preparation of riparian plans and the planting of riparian margins.

Among the targets set in the plan were for 90 per cent of Taranaki's dairy farms to have a riparian plan by 2010, and to have 50 per cent of these plans implemented by 2010 and 90 per cent by 2015.

These targets are very ambitious, and while the 2010 targets have been met, the Taranaki Regional Council, dairy industry and the farming community all recognise that the current pace for implementing the plans is not sufficient

and that further effort will be required for the 2015 target to be achieved. The challenge therefore is for farmers to accelerate the implementation over the next few years.

The dairy industry itself is working hard to ensure that riparian fencing and planting continues to increase. One innovative initiative has involved sponsorship of prize draws for farmers purchasing plants early for their riparian plans. These promotions are proving successful and contributing to significantly increased plant orders.

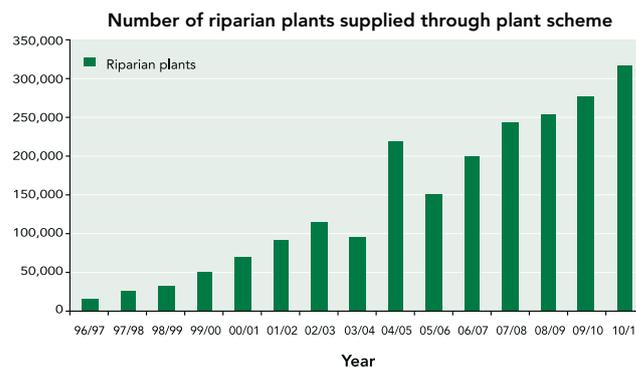
Other initiatives are also in the wind. For example, the Taranaki Regional Council and Fonterra are now developing a proposal aimed at recognising the carbon potential of the Riparian Management Programme and having it included in New Zealand's Emissions Trading Scheme.

If this initiative is successful, it will add further impetus to the retirement and planting of riparian margins.

**Riparian fencing and planting on the ring plain
– at a glance (as at 1 July 2011)**

	Existing*	New	Total streambank protection	
			Km	%
Fencing	6862	1919	8781	71%**
Vegetation	4559	930	5489	58%***

*In place before preparation of riparian plans ** Proportion of the 12,364 kilometre length of streambanks covered by riparian plans *** Proportion of the 9479 kilometre length of streambanks covered by riparian plans which need protection by vegetation.





As a Maori land-based business, and owner of several farms, PKW is conscious that it is a kaitiaki (guardian) of the whenua for future generations. Environmental sustainability is therefore a key consideration in its strategic decision-making processes, and riparian planting plays a key role in helping PKW protect and enhance its lands and environment.

DION TUUTA, PKW GENERAL MANAGER.

PARININIHI KI WAITOTARA INC COMMITMENT TO RIPARIAN PLANTING

Parininihi ki Waitotara Incorporation (PKW) is the largest dairy farmer in Taranaki. As noted by PKW General Manager, Dion Tuuta, over the past five years, PKW has enjoyed a close working relationship with Taranaki Regional Council officers to achieve effective riparian management on its properties.

In 2010, PKW in co-operation with the Taranaki Regional Council (using plants and planting contractors from Kii Tahurangi nurseries) planted 15,200 native plants in the riparian margins with approximately 4750 metres of new riparian fencing also being completed. This work was undertaken with the co-operation of PKW sharemilkers, particularly in respect of undertaking the necessary weed control in anticipation of the impending riparian planting.

PKW is held up as an example of the results that can be achieved through commitment to riparian planting. PKW has so far exceeded its riparian management targets - 60-80 per cent of waterways crossing its properties are now protected. Future riparian work will focus on some smaller creeks and watercourses that have yet to be planted.

PKW's first priority was to target key waterways flowing across its properties, including the Kapuni, Mangatoki, Waingongoro and Kaupokonui rivers. These waterways are of particular significance to Maori and the wider environment, in so far as water quality, fish-life and the flora/fauna are concerned. These waterways have now been fenced off and planted with native species to

encourage birdlife and provide a buffer zone against nutrient eutrophication and nitrogen leaching into the water table and waterways.

Completion of the fencing and the native plantings also protects the waterways from damage and effluent from livestock, and provides the key buffer as a barrier against fertiliser/nitrogen polluting and deteriorating water quality.

PKW's commitment to environmental sustainability has been recognised by the Taranaki Regional Council with an Environmental Award in relation to the protection and enhancement of a regionally significant wetland. PKW has protected Kaweora wetland for 52 years through a Nga Whenua Rahui Kawenata (Covenant). It has also permanently fenced off and retired from pastoral activities approximately 80 hectares of bush in a wetland area on the corner of Kaweora Road and Wiremu Road.



Riparian planting alongside the Kaupokonui River, where it flows through a farm owned by Parininihi ki Waitotara Incorporation.



Nick Barrett with some of the riparian planting on his North Taranaki dairy farm.

PROUD TO BE PART OF THE TARANAKI EFFORT

North Taranaki dairy farmer Nick Barrett is proud that he and his wife Christine are part of an environmental initiative that is leading the way in New Zealand.

“What is being achieved here in Taranaki is significantly different to any other part of New Zealand, with Nelson perhaps the only other region that is closest to achieving what we are doing,” he says of the Taranaki Riparian Management Scheme.

“In total, we are investing more time and money than anywhere else in New Zealand in working to improve our water quality.”

Proud words from Nick, who is a member of the Fonterra Shareholders’ Council and who farms a 185-hectare property on the western outskirts of New Plymouth. But he has good reason for them – so far he has fenced off and retired more than 90 per cent of the 23 kilometres of streambank on his property, and has planted about 80 per cent.

“When I first got my riparian plan from the Taranaki Regional Council, I worried that it was going to be such a daunting task,” he recalls.

“But the Council officers advised us to simply target one area at a time – to bite off a little bit instead of trying to do everything at once. That worked, and we discovered that once you see what you are achieving, it sows the seeds to wanting to do more.”

Nick Barrett says most Taranaki farmers want to engage with the Council, and most have already had their riparian plans drawn up. But a number have yet to begin to implement their plans – and the challenge now is to ensure this gets done.

“The next five years is the nitty-gritty. In the good dairy payout years the onus will be on us farmers to get stuck into our riparian management projects. We must accept that riparian planting is not something that might be nice to have, it’s absolutely essential to securing the future of dairy farming in Taranaki.”

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The simple solution of fencing off cattle from rivers is probably one of the most effective ways of reducing faecal matter contaminating watercourses. From the farmer's point of view, it is a solution that they can get on and do.

DANYEL HAMPSON, UNIVERSITY OF EAST ANGLIA, UK.



Auroa farmer Kevin Murphy discusses his property's riparian plan with Taranaki Regional Council land management officer Jess Soper.

EVIDENCE RIPARIAN MANAGEMENT WORKS

Riparian protection is one of the best ways to help streams, says experts.

There is clear and mounting scientific evidence supporting what is being done in Taranaki. This includes not just national and local studies but also some of the excellent research being done overseas. The research confirms that, for Taranaki catchments, riparian management is a particularly effective approach to managing diffuse-source pollution to water.

The significance of phosphorus and riparian management

In Taranaki streams, it is the concentration of phosphorus, in particular, that will determine the likelihood or extent of excessive instream growths. Phosphorus escaping or seeping into our waterways occurs from activities such as fertiliser applications, soil run-off from pasture and the collapse of streambank soil through stock trampling. Phosphorus also occurs naturally in our soils and rocks. It may therefore enter the rivers and streams coming off our mountain or through hill country erosion, and being re-suspended from streambank sediment.

Measures that reduce pasture run-off and protect our streambanks from erosion or collapse due to stock movement – such as riparian management – do have an immediate and direct benefit for improving water quality. However, the benefits of riparian management are not confined to controlling nutrient inputs, it's also about promoting long-term benefits in the ecological health and well-being of our rivers and streams by increasing shading, reducing water temperatures, providing a greater diversity of instream and streambank habitat, which, in turn, allows more complex and healthy ecological communities to thrive in our waterways.

Studies here and overseas show riparian buffers work

It is a fact that over the past 160 years, development of Taranaki's countryside for agricultural use has included the removal of streamside vegetation – and that the removal of that natural buffer has strongly influenced the quality of the region's fresh water.

The Taranaki Regional Council maintains a network of sites for monitoring the quality of fresh water in the region and

The remedial measures implemented in the study – principally fencing streams to produce a vegetated riparian zone and prevent stock access – were effective in reducing faecal concentrations by between 66 per cent and 81 per cent.



has been collecting data over long enough timeframes to establish trends. As part of the Government's performance audit into the management of freshwater quality by regional councils (2011), the Office of the Auditor-General undertook a review of the Council's monitoring information and concluded that freshwater quality is generally being maintained in Taranaki and, in some places, is being enhanced.

Firm scientific evidence demonstrating long-term improvements in the health of Taranaki waterways across the region will become more evident after greater proportions of river and stream catchments are retired and again planted, and when the growth of this vegetation provides more shading of the waterways.

While this will take years of regular monitoring, already there are ample local case studies such as the research occurring in the Waiokura catchment, which indicates that the Riparian Management Programme is working. There is also increasing anecdotal evidence suggesting that Taranaki rivers and streams seem cleaner, there is less flooding and erosion, and there is more bird and other wildlife using the newly-planted riparian margins for food and shelter.

Other research and studies carried out elsewhere in New Zealand and overseas clearly show that the fencing off of streamside margins and planting them with suitable vegetation has significant benefits that far surpass other methods of reducing diffuse pollution from pasture to streams. These studies provide a rigorous vindication of the investment by the Taranaki Regional Council and the region's farmers.



The Huatoki Stream has full riparian protection as it flows through suburban New Plymouth.

A technical paper on the effectiveness of riparian margins, published by the Ministry of Agriculture and Forestry, noted that "...riparian management can be viewed as the last line of defence for attenuating contaminants before entering the stream.

"Fencing stock out of streams and retiring riparian margins from agricultural land use are also particularly important practices to improve stream water quality. Buffer zones can filter contaminants and sediments from overland flow by increasing the infiltration into soil, intercepting particulates, and removing soluble nutrients."

A New Zealand study by the National Institute of Water and Atmospheric Research, also compared the water in stretches of waterway where there were riparian buffer



An aerial view of a well-established and properly fenced riparian margin alongside the Taungatara Stream as it flows through Ian and Judith Armstrong's South Taranaki property.

zones, to areas where there weren't. The study showed the water within the buffer zones displayed a series of improvements and that even short isolated riparian strips result in improvements.

In a study conducted by the University of East Anglia in the United Kingdom, researchers created a model of the various factors that lead to such pollution, and then used the model to test the effectiveness of different methods of cutting the pollution, using the catchment of the Humber River as a case study.

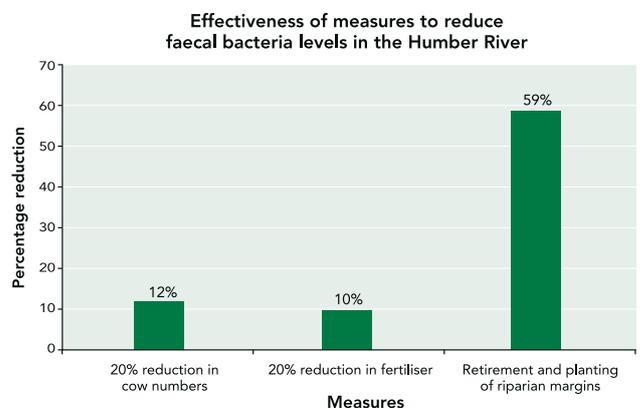
Methods trialled ranged from reducing the number of dairy cows in the area by 20 per cent, to cutting fertiliser use by 20 per cent, to fencing off streambanks and planting riparian vegetation.

The results were dramatically in favour of the fencing option. The model suggested that faecal bacteria pollution could be as much as 59 per cent lower with fenced streams and riparian vegetation than without. By contrast, reducing the number of cows would lead to a 12 per cent reduction, and cutting fertiliser use would cut the bacterial concentrations by less than 10 per cent.

Researcher Danyel Hampson stated that "the simple solution of fencing off cattle from rivers is probably one of the most effective ways of reducing faecal matter contaminating watercourses. From the farmer's point of view, it is a solution that they can get on and do."



Studies show that riparian plantings are easily the most effective way of helping prevent cow herd faecal matter from entering watercourses.



My attitude is that you might as well be proactive and get it done now while the plants are subsidised and while it is still a voluntary scheme.

DAIRY FARMER STEVE POOLE, WHOSE PROPERTY IS WITHIN THE WAIOKURA CATCHMENT.

WAIOKURA STREAM

'Best practice' farming must include riparian protection.

Down in South Taranaki there is a little stream that for the past decade has been the subject of an intensive study aimed at measuring the benefits of 'best practice' farming operations – including protecting the riparian zones along its banks.

The waterway is the Waiokura, a lowland stream that, rather than having its headwaters in the snow melt of Egmont National Park, is fed by groundwater originating from beneath Taranaki's dairy pasture.

Over the years the Waiokura has been highly modified as part of development of dairy farms in its catchment, and these days it flows through some of the most intensively farmed pasture in New Zealand.

As a result, the little stream is certainly not the cleanest stream in Taranaki. Intensive dairying along its length, involving 44 farms, has elevated the levels of nitrogen, phosphorus, suspended solids and faecal bacteria in its water.

But these are the exact reasons why in 2001 the Taranaki Regional Council selected the Waiokura to be part of a long-term national study of five catchments throughout New Zealand aimed at identifying the best management practices to help reduce the impact of farming operations on the environment.



The Waiokura Stream, which runs through a very intensive dairying area.

The Council's opinion was that if the application of 'best practice' could make a difference in a catchment as highly modified as the Waiokura, then it could make a difference anywhere in Taranaki.

As this study has progressed, farmers within the catchment have reduced the number of dairy-shed effluent discharges into the stream and have converted to land irrigation instead; they have reduced application rates of phosphorus-based fertilisers by an average of 25 per cent; and they have increased the length of streambank protected by riparian works from 40 per cent to more than 52 per cent.

The results have been highly encouraging. Regular monitoring has shown that levels of dissolved contaminants from fertiliser run-off, treatment pond effluent and sediment loss have been reduced by as



South Taranaki dairy farmer Steve Poole has witnessed the benefits of riparian planting.

much as 40 per cent, and average concentrations of bacteriological indicators such as E.coli have been falling by about 8 per cent per year.

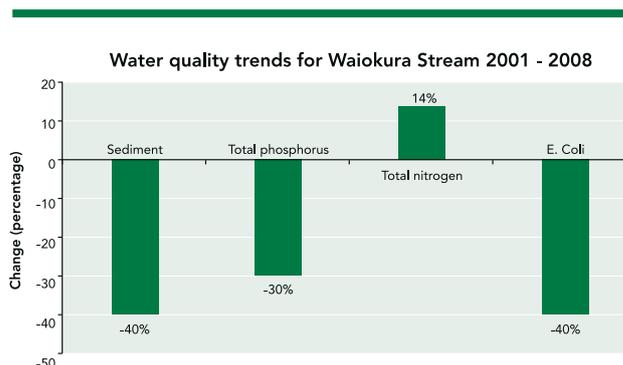
Significantly, these improvements have been achieved despite the fact that dairy farm productivity in the catchment has increased by almost 25 per cent – in other words, the improvement in environmental performance has not been at the expense of economic performance.

One farmer on the Waiokura Stream is Steve Poole, who used to have the streamside fenced off – but only so he could put his dry cows there so they could clean up the stream edges. But then he was encouraged to permanently retire the riparian margins, and he has never regretted the decision.

“At first I thought it was a nuisance, a waste of my time and money,” he says. “But now, I think the streamside has improved dramatically. We have more bird life, there is no obvious erosion, the eeling has improved for the kids, and they enjoy camping there. I can certainly see the benefits now. It’s not good practice to have stock in waterways.”

The most recent full report on the study, published in the New Zealand Journal of Marine and Freshwater Research (2009), notes significant improvements to the health of the Waiokura Stream and says reductions in discharges of dairy-shed effluent and improved riparian fencing and planting are the main reasons for this.

“Dairying is an intensive form of agriculture that occurs where there is a high degree of connectivity between the land and stream networks,” it says.



Levels of dissolved contaminants from fertiliser run-off, treatment plant effluent and sediment loss have declined by as much as 40 per cent, and average concentrations of bacteriological indicators such as E-coli have been falling by as much as 8 per cent per year.

“Riparian management is therefore essential for buffering waterways from the adverse effects of this land use,” the report adds, pointing out that the improvements in water quality have been achieved with even less than half the stream length protected.



The Huatoki Stream flowing through the centre of New Plymouth city.

HUATOKI STREAM PROVES RIPARIAN PLANTING WORKS

The Huatoki Stream is a much-loved Taranaki waterway, not the least because for the final three kilometres of its journey it flows right through the centre of urban New Plymouth.

From the moment the stream enters the boundary of Taranaki's main centre, it becomes part of a beautiful setting. First it flows through reserves that provide full riparian protection for the water, and its final few hundred metres is through New Plymouth's central business district where it is appreciated by people visiting inner-city cafes, restaurants and reserves.

In fact the stream is so appreciated that it has even had a new area of open space named after it – Huatoki Plaza, an area where shoppers and office workers can relax alongside the flowing water.

Riparian vegetation is a primary reason why the Huatoki Stream is so attractive as it flows through the city.

The first 10 kilometres of its route from its origins in farmland below Egmont National Park to the sea is through open farmland which in recent years has had little riparian cover, and which has resulted in some nutrient enrichment resulting from run-off from surrounding fields.



The stream has had little riparian protection upstream from the city.

Biological monitoring sites set up along the stream by the Taranaki Regional Council regularly check the health of the Huatoki's water by way of a Macroinvertebrate Community Index (MCI) score – a measure of the number of insects, shellfish, snails and worms that live in it.

'Sensitive' invertebrates tend to live in the cleanest water. In the case of the Huatoki, where the water flows through the open farmland with no riparian cover, the MCI score is around 90, which indicates moderate water health.

But when the stream enters the city boundary and flows through the full riparian protection offered by the bush reserves, the MCI score increases to around 108, which indicates a rapid and very significant improvement in the health of instream communities.

This means that by the time the Huatoki emerges from the riparian cover for that final stretch through the



central business district, its biological health has been substantially restored to a state not far below its best condition at its source.

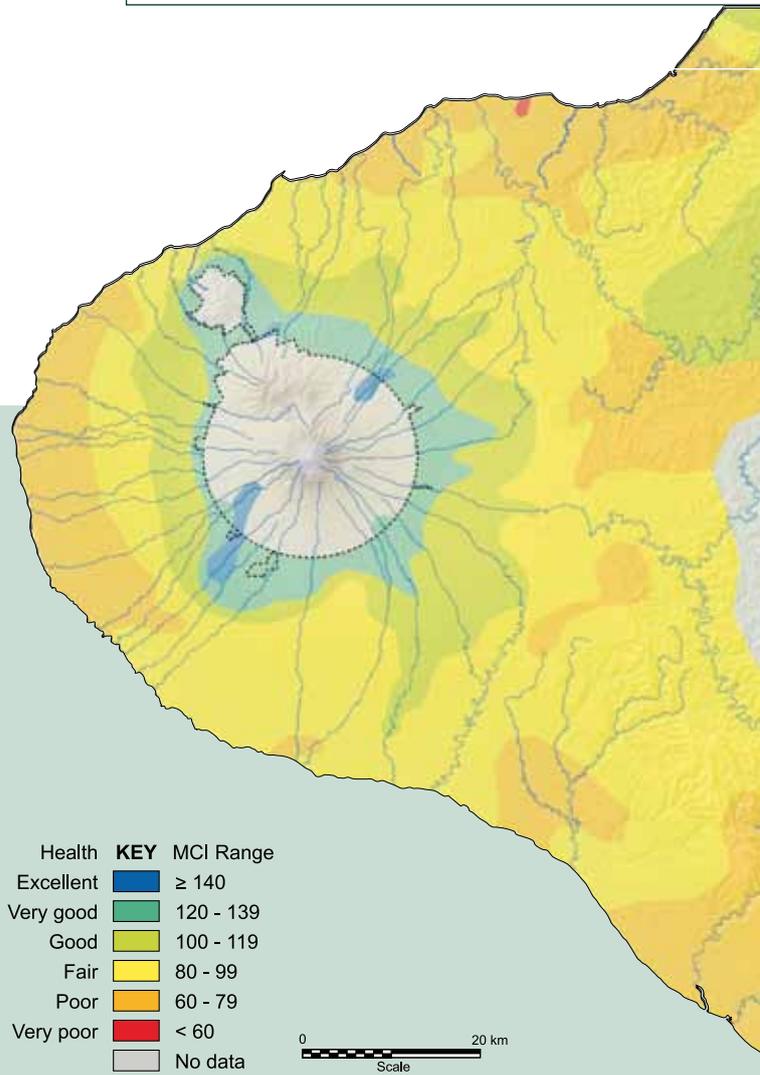
The Huatoki is an outstanding example of what can be achieved by riparian protection. Thanks to that inner-city bush cover, what happens to the stream is the reverse to what happens in typical rivers and streams around the Taranaki ring plain.

Taranaki water quality

Taranaki has high overall water quality compared to other places. However, this map demonstrates a gradual decline in stream health – as measured by freshwater invertebrates (MCI scores) – from the Egmont National Park downstream to the coast.

To a certain extent this decrease is a natural and inevitable result of the changing physical habitat downstream. It is also due to the cumulative effects of land uses on water quality and habitat such as nutrient runoff, lack of riparian management, and increased sedimentation as a result of erosion of the stream margins.

It is important to realize that MCI values lower down the catchment cannot match those higher in the catchment, even under ideal conditions, because of habitat changes. Freshwater invertebrate communities are strongly influenced by the physical habitat, which in turn, is influenced by altitude.





Typical riparian planting alongside a small stream.

SCOTTISH EXPERIMENT PROVES RIPARIAN PLANTING WORKS

All over the world, there is mounting scientific evidence proving the success of the concept of fencing off the banks of rivers and streams to protect them from contamination by surface run-off.

An example of strong relevance to Taranaki is a study, managed by the Scottish Environment Protection Agency, of the stream catchment flowing into Brighouse Bay in Southern Scotland. It has relevance because – like many parts of Taranaki – the catchment is a rural region dominated by livestock farming, and with a low human population.

The principal source of faecal contamination in the Brighouse Bay catchment is from the animal population, says the study.

It adds: “The practice of spreading faecal wastes on catchments is a central component of sustainable nutrient cycling in all temperate livestock farming systems. This presents an obvious threat to the compliance of receiving

environments even where the farmers are following current good-practice codes.”

How can this threat be overcome? While the study looked at a number of remedial measures, the principal means was fencing off the riparian zones along the stream banks to provide a buffer zone between livestock and the stream channels.

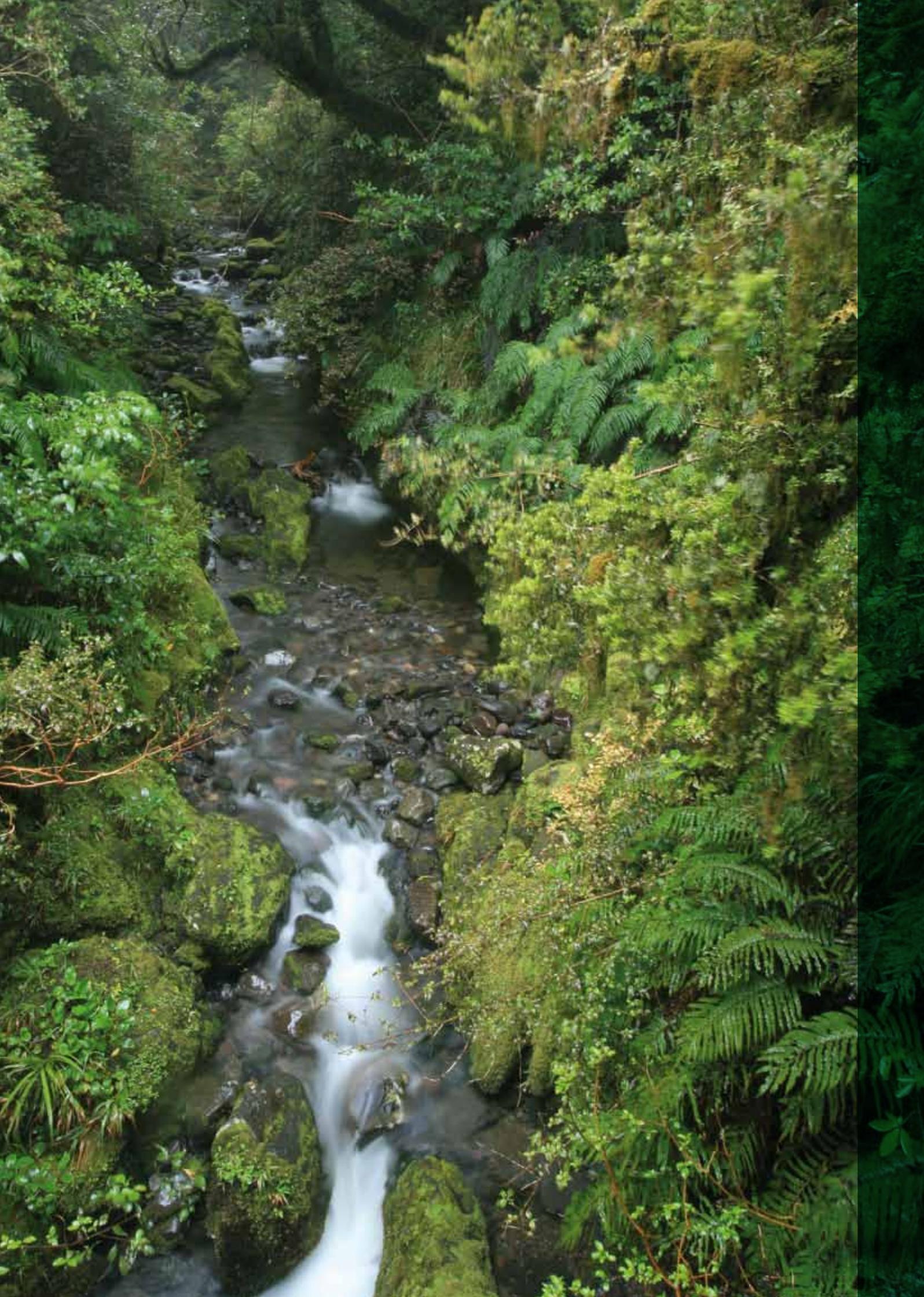
The Brighouse Bay catchment was seen as an ideal location for this study, because it involved seven farms contained wholly within the catchment’s hydrological drainage basin.

Water quality sampling was undertaken over four weeks prior to the fencing, and sampling was undertaken after the buffer zones had been created in an effort to establish water quality under both low-flow and high-flow conditions.

The results were impressive.

While the study’s report warns that there were too few results for rigorous statistical analysis or to draw firm conclusions, improvements in water quality were achieved when riparian buffer zones were created along as little as 30 per cent of total streambank length.

The results also suggest that the remedial measures implemented in the study – principally fencing streams to produce a vegetated riparian zone and prevent stock access – were effective in reducing faecal concentrations by between 66 per cent and 81 per cent.





COMPLETING THE PROGRAMME

It is clear to me that within a decade the margins of all streams passing through Taranaki's dairy farms will be fenced to exclude stock and vegetated. The choice of how is presently with farmers.

The Taranaki Riparian Management Programme is of broader relevance than just a narrow focus on water quality or the 'green environment'. It is part of a wider agenda for one of Taranaki's and New Zealand's major industries – a strategy of looking forward and responding to all opportunities and threats to the dairy business.

The Programme is, for Taranaki, a key part of insuring the future of dairy farming and its ability to continue to develop and become more productive. Sustainable dairying you could say. It is what sustainable and innovative businesses do – they look forward and respond in a way that allows a measured and affordable response. They seek to take control rather than be controlled.

So now, I'd like to present you with two Taranaki scenarios.

The first scenario is essentially the present case whereby the region's farmers voluntarily participate in an initiative aimed at fencing and planting the banks of every river and stream that runs from Mt Taranaki to the sea – the Taranaki Riparian Management Programme.

Largely because it is voluntary, there is ownership of the Programme by farmers, which is important because riparian management is not just a one-off. Ongoing active management, although not onerous, is required.

Taranaki's residents, in turn support the farmers' efforts by agreeing to financially assist the Programme by allowing a portion of their Taranaki Regional Council rates to be used for various support actions, including the preparation of individual riparian plans and the provision of bulk purchased plants.

Farmers are the 'heroes' in this scenario. They continue to own the issue and control the response. In so doing they manage the timing and budgets for riparian management, and costs are minimised. The Regional Council's input is rate-funded assistance as opposed to the expensive direct charges to farmers that would occur with a compliance monitoring and enforcement regime allied to a compulsory scheme.

In the second scenario, the riparian initiative isn't voluntary. It is compulsory and required by law.

Environmental regulations are in place requiring farmers to fence off land either side of their rivers and streams and to plant it with vegetation. Because it is a regulatory requirement, the Taranaki Regional Council is now required by law to regularly monitor and enforce compliance with each riparian plan, and this cost is met by individual farmers. Any farmers not meeting minimum requirements may face prosecution. They may also face payout penalties from dairy companies. Across the board costs are higher. Not only does it cost individual farmers more via monitoring and compliance charges, but there is much less individual discretion in programming and budgeting for the development and maintenance of fenced-off riparian margins.



It is clear to me that within a decade the margins of all streams passing through Taranaki's dairy farms will be fenced to exclude stock and vegetated.

**BASIL CHAMBERLAIN, CHIEF EXECUTIVE,
TARANAKI REGIONAL COUNCIL.**

Although many farmers will have proactively addressed their responsibilities, the collective reputation of the industry will yet again be tainted by the poor performers who need to be led, as opposed to leading and taking control.

That second scenario isn't a pretty one, is it? Unfortunately it could happen. The Taranaki Regional Council has commenced a mandatory ten-yearly review of its Regional Fresh Water Plan for Taranaki, and this process will be considering future options such as the introduction of rules aimed at maintaining or improving water quality in the event of inadequate progress on riparian management. The Government is also bringing forward statutory policy regulation which will 'turn up the heat' for rules-based approaches to be adopted and applied.

As this document outlines, several years ago the Taranaki Regional Council identified the protection of riparian margins as an effective means of protecting freshwater quality while at the same time allowing intensification of the region's dairy industry. Quite simply, riparian management works and international and local research strongly endorses the validity of the programme, especially for a region with the characteristics of Taranaki.

Collectively the task is large, indeed of international scale, but by each attending to our individual parts and by helping each other over reasonable timeframes, the Programme is realistic and achievable. To date the Programme has been a success. Large numbers of farmers have grasped the non rules-based concept and accompanying advantages of the Taranaki Riparian

Management Programme. They have taken ownership of it and acted.

Taranaki's farmers are to be congratulated for this. But more still needs to be done – and the challenge now is for this to happen in a way that retains the many advantages of the voluntary approach before any new regulations and standards require it to be done.

As for any group of people, I have no doubt that there will be some who, regardless of the obvious advantages of the first scenario, will wait to be led and controlled – to be regulated and required to do the inevitable. For the rest of us the challenge is to ensure that, through our actions, the number of people that need to be dealt with when regulation happens is insignificant.

My appeal to farmers is to continue to build on the Programme's momentum. The Taranaki Regional Council has and will continue to support you to do this. Much has been achieved thus far, and we are beginning to be internationally recognised for our efforts. Please be part of this success.

A handwritten signature in black ink, appearing to read 'Basil Chamberlain'. The signature is fluid and cursive, written over a white background.

Basil Chamberlain
Chief Executive
Taranaki Regional Council



Our rivers and streams are highly valued as habitats for aquatic life and to provide recreational opportunities. The Taranaki Riparian Management Programme is the most extensive in the country and is one of the methods which assists in protecting water and habitat quality and future-proofing land use. Other methods may also be required to safeguard our waters from runoff where this lowers water quality below limits which sustain public uses of water bodies.

NEIL DEANS - RESOURCE MANAGEMENT COORDINATOR,
NEW ZEALAND FISH AND GAME COUNCIL.

Taranaki Regional Council

Working with people - caring for Taranaki

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