

Taranaki Regional Council's Riparian Management Programme[©]

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STATUTORY OBLIGATIONS

The Taranaki Regional Council (TRC) has a statutory obligation under the Resource Management Act 1991 (RMA) to give effect to the fundamental purpose of promoting the sustainable management of natural and physical resources in carrying out its functions in the Taranaki Region. In particular, Sections 6 and 7 of the Act recognise the importance of preserving the natural character of rivers and their margins and the protection of them from inappropriate use; protection of significant areas of indigenous vegetation and habitats of indigenous fauna; and maintenance and enhancement of amenity values. Furthermore, Regional Councils are required under the RMA to prepare a Regional Policy Statement that identifies significant issues in the region along with objectives, policies, methods of implementation, and environmental results anticipated. One of the key issues identified in Taranaki is the degradation of water quality resulting from diffuse source contamination from agriculture. Council has identified riparian management as one of the preferred methods of improving water quality.

DAIRY FARMING IN TARANAKI

Over 291,000 ha of land are used for dairy production in Taranaki, with most of it dissected by approximately 300 streams and rivers radiating from Mount Taranaki (Taranaki Regional Council, 2000). Over the last 20 years, cow numbers have increased from 208,300 in the 1986–1987 season to 495,000 in 2000–2001 (Table 1) (Livestock Improvement Corporation, 2006).

This has resulted in an average increase of stocking rate from 1.45 cows per hectare in 1979–1982 to 2.8 in 1998–2001; however, actual stocking rates range from 0.9 cows per hectare to a maximum of 5 per hectare with the most intensive dairying occurring on the South Taranaki ring plain (Taranaki Regional Council, 1998). The greater number of cows per hectare has increased the potential for nutrients, organic matter, and bacteria to enter both surface water and groundwater.

Table 1. Taranaki cow numbers.

Year	Dairy cow numbers
1986–1987	208,300
1995–1996	427,000
2000–2001	495,000
2005–2006	481,272

FUNCTIONS OF RIPARIAN MARGINS

Riparian margins are the strips of land adjacent to waterways and are the interface between land and water. Subsurface and groundwater flow often emerges along stream margins. These riverine wetlands and associated flora, intercept nutrients and bacteria, preventing them from entering waterways. Retention of water in seepage areas also helps reduce flooding by regulating the flow of water.

Stream bank vegetation is particularly important in the riparian margin. It provides a source of organic matter and food to both terrestrial and aquatic fauna and provides the habitat for many insects with stream-dwelling larvae. Vegetation also provides shading of the waterway, which reduces water temperature; therefore, more dissolved oxygen is available for fish. Less solar radiation also reduces the proliferation of algae and macrophytes. Tree roots provide structural support to stream banks, which helps prevent erosion and sediment entering waterways.

Impacts of Land Use on Waterways. The intensification of dairying has increased the loadings of dung, urine, and nutrients on pasture. Much of the vegetation along river and stream margins has been removed during the course of land development in Taranaki, and existing riparian vegetation is now found predominantly in the mid to upper reaches of mountain fed catchments (Taranaki Regional Council, 1995). Approximately 10,500 km of stream bank is devoid of adequate riparian vegetation. In the lower reaches, cows typically graze pasture to the water's edge, resulting in the breakdown of the banks. Grazed stream banks provide no physical barrier to runoff, allowing contaminants to enter waterways more freely when it rains. Where cattle cross streams without bridges or culverts, they are 50 times more likely to defecate directly in streams than on adjacent races (Davies-Colley et al., 2002). When high *Escherichia coli* levels derived from dung are found in water, they are indicative of *Giardia*, *Cryptosporidium*, *Salmonella*, *Fosciola*, *Leptospira*, and *Campylobacter*, which are harmful to human health (Ministry for the Environment, 2001).

Intensification of farming has also led to the increased application of fertilizers to pasture. Nitrogen fertilizers are taken up by grass plants, which can result in nitrate concentrations of N between 500–1000 kg·ha⁻¹ in cow urine patches (Haynes and Williams, 1993). Saturated soils are not able to utilize excess, plant-available nitrate, which is consequently leached through subsurface routes into shallow or deep groundwater. High soil phosphate levels can result in phosphate entering waterways adsorbed to soil particles and it is often the limiting factor for algal proliferations when combined with warm water temperatures and solar radiation (Collier et al., 1995).

Water Quality. In general, Taranaki has excellent to moderate quality in most mountain-fed streams (Taranaki Regional Council, 2003). However, there is a general trend of reduced water quality from the Egmont National Park boundary to the sea, as measured by the Macroinvertebrate community index (MCI) (Taranaki Regional Council, 1999). To a certain extent, this is a natural result of changing physical habitat downstream. Moreover, it is also due to the effects of agricultural land uses on water quality and habitat such as nutrient run-off, loss of riparian vegetation, and increased sedimentation as a result of erosion of the stream margins. These cumulative impacts of non-point source run-off and point source discharges through intensive dairy farming catchments and centres of human population are a significant issue for Taranaki.

RIPARIAN MANAGEMENT STRATEGY AND RIPARIAN PROGRAMME

In 1993, Council adopted a riparian management strategy after extensive consultation with the rural community (Taranaki Regional Council, 1993). The preferred strategy for promoting riparian management in the region was a combination of

education and advocacy at a region wide level, with service delivery in the form of technical advice through riparian management plans. Riparian management plans were developed and have evolved over time from a basic schematic with recommendations and costings, to the current computer-based model using state of the art customized software. All plans are prepared from fieldwork and, therefore, are the most accurate account of a farm's stream bank fencing and vegetation status. Emphasis is on building relationships with farmers through "one-on-one" contact to help them implement the plan's recommended planting and fencing proposals. Plan holders are visited annually to record implemented works, to provide further onsite advice and information, and to take a plant order for the following winter. Native plants are generally recommended because of the moist Taranaki climate and the potential to enhance the region's biodiversity. As riparian planting increases, the demand for plant material is also expected to rise. In 2003, the Dairying and Clean Streams Accord was signed between Fonterra, Ministry for the Environment, Ministry for Agriculture and Forestry, and Regional Councils. It includes a set of national environmental targets and deadlines to help reduce the impacts of dairying on the quality of New Zealand streams, rivers, lakes, groundwater, and wetlands. The Accord allows for regional interpretation of the national objectives through regional action plans. The regional action plan for Taranaki requires 90% of all dairy farmers to have a riparian management plan in place by 2010 and to have 90% of all waterways fenced and planted by 2015 (Taranaki Regional Council, 2004). The Accord has helped accelerate the creation of riparian plans and at the end of June 2006, 50% of dairy farms now have plans. Plan creation has gone from 60 plans per year up to over 300 since the adoption of technology based on Geographic Information Systems in 2002.

Riparian Plant Scheme. In parallel with Council's riparian strategy, a scheme to meet the demand for native plants was developed through a tendering system. The tender was first advertised in 1996 to supply 15,000 plants consisting of 20 different species and was awarded to six nurseries. In 2006, 200,000 plants consisting of 35 species were tendered and awarded to 14 suppliers (Table 2).

Table 2. Plant species supplied in 2007.

Botanical name		
<i>Carex secta</i>	<i>Dacrydium cupressinum</i>	<i>Olearia solandri</i>
<i>Cortaderia fulvida</i>	<i>Dodonaea viscosa</i>	<i>Olearia traversii</i>
<i>Phormium tenax</i>	<i>Fuchsia excorticata</i>	<i>Pittosporum crassifolium</i>
<i>Phormium cookianum</i>	<i>Griselinia littoralis</i>	<i>Pittosporum eugenioides</i>
<i>Aristolelia serrata</i>	<i>Hebe stricta</i>	<i>Pittosporum tenuifolium</i>
<i>Carpodetus serratus</i>	<i>Hoheria angustifolia</i>	<i>Podocarpus totara</i>
<i>Coprosma repens</i>	<i>Melicytus ramiflorus</i>	<i>Plagianthus regius</i>
<i>Coprosma robusta</i>	<i>Metrosideros excelsa</i>	<i>Pseudopanax arboreus</i>
<i>Cordyline australis</i>	<i>Myrsine australis</i>	<i>Pseudopanax crassifolius</i>
<i>Corokia macrocarpa</i>	<i>Olearia virgata</i> var. <i>lineata</i> 'Dartonii'	<i>Pseudopanax laetus</i>
<i>Corynocarpus laevigatus</i>		<i>Sophora microphylla</i>
<i>Dacrycarpus dacrydioides</i>	<i>Olearia paniculata</i>	

An invitation to tender for the supply of native plants is advertised in two North Island newspapers around July of each year. Nurseries must request the plant schedule, plant specification, and the conditions of supply in writing. After the closing date, data from eligible tenders are then entered into a customized database for evaluation. A database programme has been written to compare instantaneously, preferred grades, quality, and price across all nurseries and species. The programme's evaluation is then used by the evaluator to make the final selection. Successful tenders are awarded around numerous criteria and are followed by the creation of contracts between Council and the respective nurseries. There is often more than one contracted supplier for each species as production of large numbers is often beyond the capacity of individual nurseries. Delivery during the last week of May is to any of four dispatch sites around Taranaki and must be included in the contract price.

Land management officers take plant orders from landholders throughout the year until the contracted supply is accounted for. If demand is very high, a second tender may be advertised during February or March of the following year. Additional plants are often purchased when demand for a particular species is high. The sale price to landholders for individual species is calculated by dividing the total cost of purchase for that species by the number of plants purchased. Over the last 10 years, the average sale price per plant across all species has been less than \$2 for predominantly PB3 grade plants around 50 cm tall, delivered. The individual species sale price ranges from \$1.90 to \$2.70 depending on the level of competition through the tendering process and the total number of that species required. Since 1996, the demand for native plants through Council's plant scheme has increased significantly (Fig. 1) and its one-millionth tree is expected to be planted in 2007 (Taranaki Regional Council, 2006).

The advantage of the plant scheme to nurseries is a guaranteed income and payment, a 25% advance payment once the contract has been completed and the re-

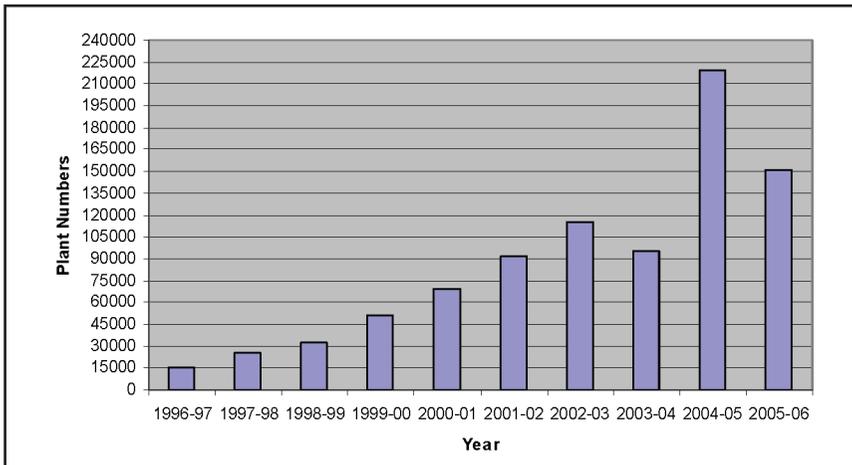


Figure 1. Increase in plant numbers by year between 1996/1997 and 2005/2006.

duced risk of carrying surplus stock. Advantages accrued to farmers are the provision of good quality plants at wholesale rates to implement planting and meet regional action plan targets. Without Council's native plant scheme, regional plant demand could not be met by local nurseries without them making significant investment in resources and increased risk taking.

CONCLUSION

Taranaki Regional Council has a statutory obligation to protect and enhance water quality and river margins in Taranaki.

Taranaki is the second largest dairying area in New Zealand and is a major economic contributor to the wealth of the region. However, it has also resulted in the loss of 60% of its riparian vegetation and many riverine wetlands have been lost through drainage.

The intensification of dairying and associated runoff has resulted in the degradation of water quality.

Riparian margins perform an important function between the land and water interface.

Riparian management is a part of Council's preferred strategy to improve water quality and has developed a strategy and implemented a riparian management programme to achieve it.

A key component of the programme is through individual property planning to facilitate the implementation of riparian planting.

Over 10,000 km of stream bank is estimated to require planting by 2015 to meet the Clean Streams Accord Target.

To meet demand for plants, a native plant scheme has been developed to help make planting more affordable for landholders.

Plant numbers through Council's scheme have increased significantly.

Benefits have accrued to both landholders and nursery suppliers through the tendering process.

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