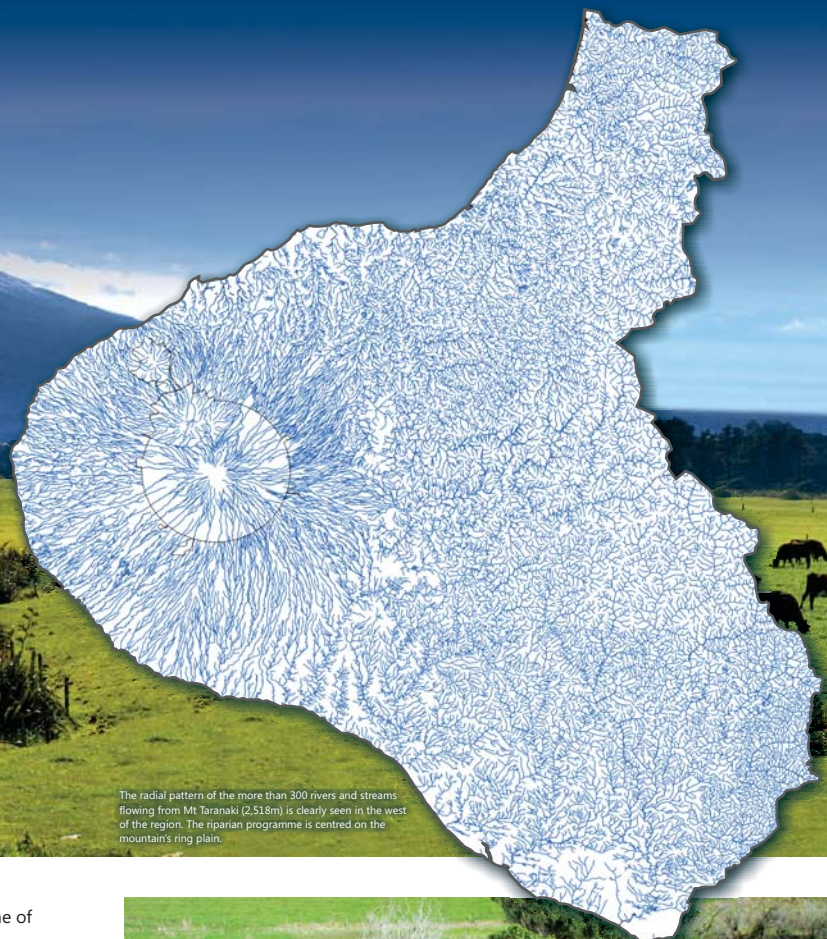


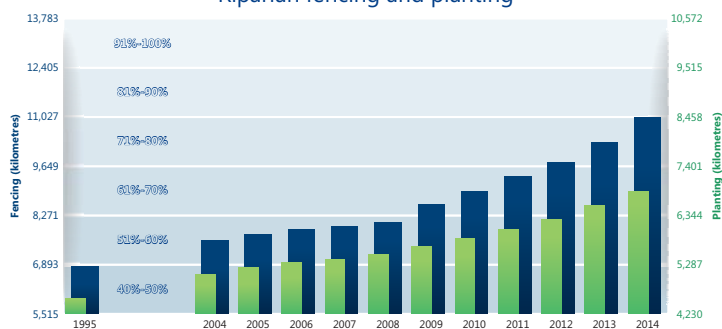
Transforming Taranaki

the riparian programme in Taranaki, New Zealand



The radial pattern of the more than 300 rivers and streams flowing from Mt Taranaki (2,518m) is clearly seen in the west of the region. The riparian programme is centred on the mountain's ring plain.

Riparian fencing and planting



The progressive implementation of the Council's riparian programme, against the targets set in 1994 for fencing (left axis) and planting (right axis) and on a percentage basis (background bands). With minimal fencing or planting in the 1994-1995 year, the data for 1995 essentially represents pre-existing riparian management.

Dairying in New Zealand is pasture-based year round. Taranaki is one of New Zealand's most productive dairying regions, with 1,760 dairy farms and 490,000 dairy cows. It is also highly dissected by a pattern of radial streams. With 13,000km of stream banks on the ring plain, the average farm property (120 hectares) has over 7km of stream bank, with over 35km on some farms. This brings challenges for managing point source and diffuse runoff pollution to maintain the quality of the receiving waters.

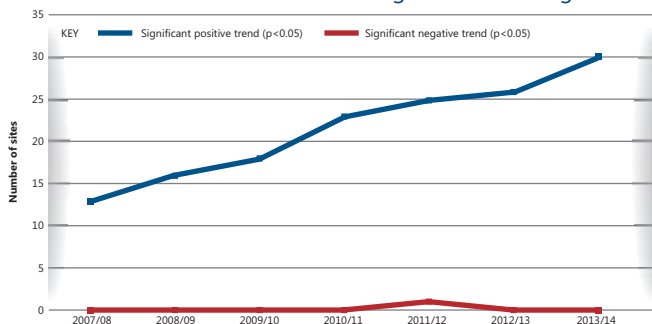
Despite a doubling of cow numbers in Taranaki over the last forty years and a huge increase in the use of urea fertiliser since the early 1990s (replacing clover-based nitrogen fixation), water quality in the Taranaki region has remained stable or shown improvement overall. Measures of stream health such as macroinvertebrate community abundance and diversity show long-term ecologically and statistically significant improvement. Significant improvements have emerged more recently (2006-2014 data) in nutrient levels also.

These trends are associated with a voluntary and unsubsidized regional programme of riparian fencing and planting implemented progressively from 1994. It is anticipated that by 2020, 6,300km of riparian exclusion and 5,400km of riparian strip planting will have been completed, at an estimated cost to farmers of \$NZ 80 million (Euro 50 million).

Analysis of various possible drivers of the region-wide improvements in ecological condition of streams and rivers, along with more recent reductions in nutrient concentrations, emphasizes that the strongest association is with the progressive implementation of the riparian fencing and planting programme.

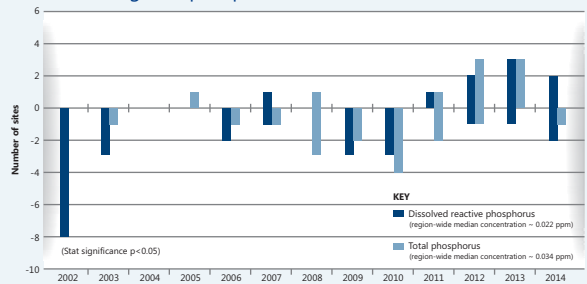


Macroinvertebrate trends for regional monitoring sites



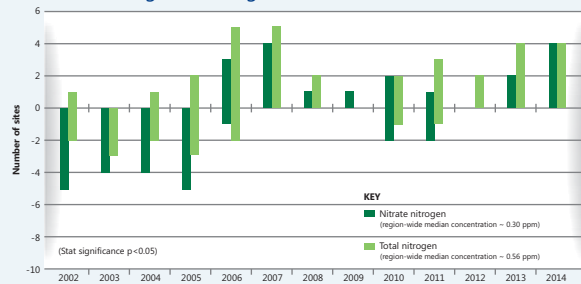
The number of sites each year found to show a statistically significant (p<0.05) improvement (blue) or deterioration (red) in ecological condition when trends are calculated from 1995 to year to date. Only sites where the change is also ecologically meaningful are included.

Regional phosphorus trends in surface waters



Aggregated trends (statistically significant trends only, at a probability level of p<0.05) for dissolved and total phosphorus across the Council's physico-chemical monitoring sites for water quality. Positive axis indicates an improving quality (reducing concentration). Trends have been calculated on a rolling 7-year average basis, and are shown against the last of the 7 years. For example, when calculated across the 7 years 2004-2011, of the Council's 11 sites, one showed an improving (reducing) concentration of DRP, one showed an improving (reducing) concentration of TP, and two sites showed a deterioration (increase) in TP.

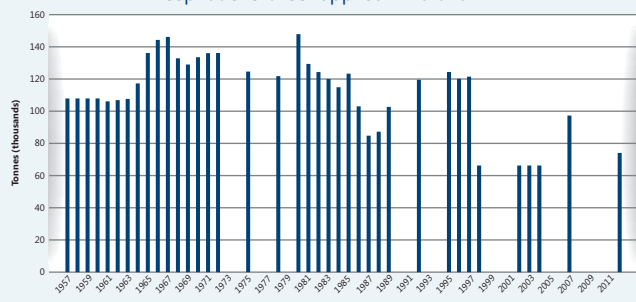
Regional nitrogen trends in surface waters



Aggregated trends (statistically significant trends at a probability level of p<0.05) for nitrate and total nitrogen across the Council's physico-chemical monitoring sites for water quality. Positive axis indicates an improving quality (reducing concentration). Trends have been calculated on a rolling 7-year average basis, and are shown against the last of the 7 years. For example, when calculated across the 7 years 2004-2011, of the Council's 11 sites, one showed an improving (reducing) concentration of nitrate, and two showed a deterioration (increase) in nitrate; while three showed an improving (reducing) concentration of TN, and one site showed a deterioration (increase) in TN.



Phosphatic fertiliser applied in Taranaki



These two graphs show the tonnage of nitrogenous and phosphatic fertiliser applied each year in the Taranaki region. It should be noted that the application figures include fertiliser applied across sheep and beef farms in the region's hill country. Application rates and overall quantities for this sector are lower than for dairying (especially for nitrogenous fertilisers). As can be seen, the use of phosphatic fertiliser in the region has been stable since about 1998, having reduced from rates seen in previous years, whereas the use of nitrogenous fertiliser (especially urea) has climbed dramatically over the same period.

Nitrogenous fertiliser applied in Taranaki

