

Mangatainoka River Scheme

Protection for Productive Communities

A History of Change in the Mangatainoka Valley

Flooding in the Mangatainoka would have been almost unknown to the pre-European valley dwellers. The well-timbered stands of Rimu, Matai and Totara percolated the rain allowing water to enter the shallow river slowly, and buffered the surrounding swampy countryside from the ravages of fast-flowing flood water.

Today, the Mangatainoka valley contains some of the most fertile dairy farming land in the country. It enjoys adequate, well-spread rainfall and has deep alluvial soils. However, clearing the forests and draining the land to make way for farming resulted in rainwater making

its way more rapidly to the river.

The faster motion of the water deepened the river channel, speeding up the process of erosion and starting the movement of gravel downstream. In trying to re-establish its equilibrium, the river both eroded its banks and meandered sideways, increasing its length to reduce the speed of water flowing down the channel. Heavy rain can now cause flooding, bank erosion and devastation to the adjoining valuable farmland.

River Management is Essential

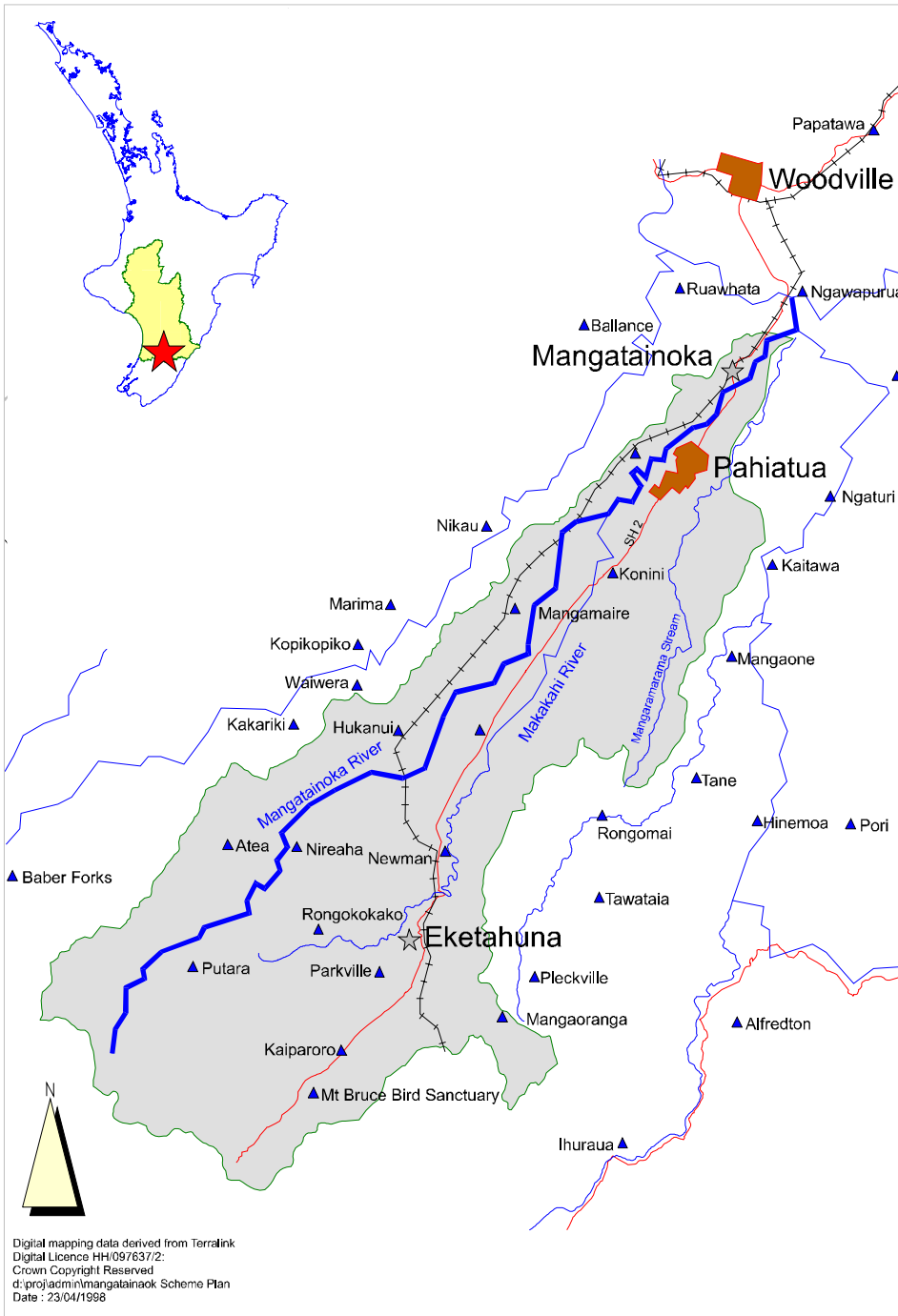
Settlers along the Mangatainoka valley sent many requests for protection work to the fledgling

Mangatainoka Catchment Board as early as 1945. The Board's first Chief Engineer proposed a scheme aimed at preventing erosion and flooding in the valley. The scheme was approved by the Government in 1951 and a 3 for 1 subsidy was granted to help with the work.

In 1964 a severe flood destroyed much of this protection work. This event, together with a reduction in subsidy to 2 for 1 in March 1970, resulted in a serious shortage of funds and invoked a Catchment Board review in 1978. The Board resolved to include the whole catchment area in a rating system, as none of the Valley communities could continue to operate, or even exist, without protection from flood damage.



Methods of river protection used in the Mangatainoka River Scheme



The Mangatainoka Catchment Area

The Mangatainoka River is a dynamic, living river, subject to considerable channel movement. The Makakahi River is a tributary of the Mangatainoka, joining it above the Pahiatua township. In the past, flood waters in the Mangatainoka have crossed the intervening land to enter the Makakahi at two or three places along the valley, causing severe damage to property and roads.

The Mangaramarama Stream drains some of the land adjacent to the Mangatainoka and the Makakahi, but its water does not connect with the main rivers. Both Mangaramarama and the Mangatainoka Rivers enter the Tiraumea River just before the confluence with the Manawatu River.

**Gravel Extraction**

Gravel builds up on the inside bends of the river forming beaches and putting pressure on the opposite bank. In some cases gravel has to be removed to prevent flooding.

**Gabion Construction**

A gabion is a structure designed to stop erosion of the river bank. It consists of a double row of steel rails, intermeshed with steel netting and filled with screened stones obtained directly from the river bed.

**Riprap Rock Work**

The river bank is shaped and rocks are placed with the largest rocks at the base of the river bank, in a toe (hole). Progressively smaller rocks up the bank give a regular rock-lined surface.

**Tree Layering**

To alleviate erosion of a river bank where larger willows are already established, the trees are cut part-way through, dropped towards the water, and tied in place. The branches trap the fine silt and take root to help to rebuild the bank.

**Tree Planting**

Trees, particularly varieties of willow, are planted extensively to stabilise river banks. Where stability is a particular problem, netting is used as a frame to hold the trees in place. Smaller, bushy varieties of willow can be used lower down the bank to trap fine silt, with larger varieties higher up the slope, to be harvested at a latter date for live tree bank protection.

**Bed Control Structures**

Large quarry rocks are placed across the width of the river to spread the flow of water evenly, while allowing access for fish passage. This photo shows two bed control structures, either side of the Pahiatua town bridge.

horizons.mw's Approach to River Management

horizons.mw took over the role of the previous catchment boards in 1989, including the management of the Mangatainoka River Scheme, which gives direct benefit to 13,000 hectares of rural and urban land and the township of Pahiatua.

In 1994 the Regional Council reviewed the Scheme, and since that time has budgeted nearly \$400,000 annually for river protection. Since 1994, when devastating floods again destroyed much of the protection work, an additional \$500,000 has been spent on repairs. Half of this sum was a grant from the Regional Council and half was raised as a loan, which is being repaid by the Scheme over 10 years.

Management of the Mangatainoka Scheme involves allowing the rivers

as much natural movement as possible, within defined limits, while protecting roads, railways, and adjacent farm buildings and land.

To make the best use of available resources two priorities have been set:

- planting of suitable tree species on the strips of land close to the river to increase the stability of the river banks
- encouraging the landowners adjoining the river to act responsibly in keeping stock away from planted areas and places where erosion control has been carried out, or where the bank is unstable.

Eleven bridges span the Mangatainoka River on its convoluted way down the valley, putting important physical constraints on the amount it can

deviate from its channel. Confining a river is expensive. For example a gravel build-up often occurs just above a bridge where the flow of water is restricted. If the gravel is not cleared it may cause flooding when water levels in the river are high.

Much of the skill in managing the current Mangatainoka River Scheme is in carrying out the work necessary to protect the interests of the valley communities as cost effectively as possible. Where it does not affect communications or valuable assets, the river meanders on its own way uninterrupted - an asset in its own right providing recreation and pleasure to valley residents and visitors alike.

For more information about the Mangatainoka River Scheme phone Peter Davies, Regional Operations Manager, at the **horizons.mw** on 06-357 9009, or Ron Minnis, Area Engineer at **horizons.mw** Pahiatua Office 06-376 7758

