

SUSTAINABLE LAND MANAGEMENT 2

HILL COUNTRY EROSION

Stabilising land on Mangapapa Station, Waitotara

THE FARMERS

- David and Karen Peat.
- Mangapapa Station, Makakaho Valley, Upper Waitotara Valley, Taranaki.
- 20 km north of Waitotara, South Taranaki.
- 25 km northwest of Wanganui.

SHEEP AND BEEF FARM

Mangapapa Station is situated on medium to steep hill country northwest of Wanganui. The farm is a mix of strongly dissected hill country with small pockets of rolling and plateau country and alluvial flats. There is a large area of rolling to steep hummock land developed from old slumps. Soils are a mix of allophonic (from volcanic ash) and brown (from soft sedimentary rocks). Altitude ranges from 80 to 600 metres above sea level and the rainfall is 1200 to 2000 millimetres. The farm is a long narrow L shape with a 12-kilometre central lane. The farm has good plateau country, which along with the use of forage crops, allows about 80 percent of stock to be finished for sale to the works. The pastoral area is mainly of moderate contour and is highly productive but prone to slumping.

CURRENT LAND USE

Mangapapa Station is 3534 hectares including 126 hectares leased. The effective area grazed is 2100 hectares with 92 percent on Class 6 and 7 land and the remainder on Class 3 and 4 land. The balance of land consists of 1000 hectares of virgin bush, 400 hectares of regenerating bush, and 34 hectares of wetlands.

STOCKING

In 2009, the sheep and beef operation carried 16 800 stock units. This consisted of 8000 ewes, 2500 hoggets, 325 breeding cows and 450 other cattle.

A large area of Mangapapa Station would be at risk if areas prone to slump erosion were left untreated. The owners have been steadily reducing the risk by planting poplars over the last 25 years.

The farm has been in the family since 1892 with David the fourth generation to work the land. David and Karen have been operating the property since the mid-80s. Development has included subdivision into 40 main paddocks and over 200 kilometres of tracks including a 12 kilometre central lane. There are 1000 hectares of virgin native bush and 400 hectares of steep land which have not been stocked for over 30 years and have regenerated back, firstly to manuka, then mixed to native bush. A special feature of the farm is the many attractive small lakes and wetlands.

DRIVERS OF CHANGE

The majority of the steeper land has been left in native bush and the remainder of the farmed area does not have much erosion, apart from a small area that is very prone to slumping, and stream banks which are prone to scour and collapse. Severe erosion in these areas eats into and de-stabilises good farmland.

David started a programme 25 years ago to slow down and stop this erosion by planting poplar poles, initially targeting the slumps on easier contour land and then along stream

banks and gullies. The plantings are small but protect larger areas from future erosion.

In 1997, on the suggestion of the Taranaki Regional Council, David formalised his erosion programme by getting a council farm plan and expanded into stream bank protection. He found the soil type and land capability information provided in the council farm plan useful for understanding his erosion problem and his farming business in general. Having a farm plan also qualifies him for planting and fencing grants from the Taranaki Regional



David Peat next to a slump on Mangapapa Station.

Council which gets funding from MAF's Hill Country Erosion Fund. David has also received assistance from the QE2 Trust and the South Taranaki District Council.

David has been planting 200 to 600 poles per year. These have mainly been poplar poles but willows have also been used in wetter areas. David has stayed with poplar poles as he feels their root system does a good job of stabilising the soil and providing continued grazing, along with shade and shelter.

Apart from the large area that the family left to revert many years ago, David and Karen have only retired a small area and instead concentrated on pole planting. They feel the treated areas are too difficult for forestry and find poplar poles need a lot less silviculture than pines. The poles are planted roughly 6 to 10 metres apart but the density is adjusted as needed for each site. Overall, one to two hectares per year are planted so it is a small but very important area. The poles are generally planted by David and the farm staff in the winter when they don't need to spend so much time on stock work.

OUTCOMES

The planted areas have not been measured but would only make up a small percentage of the grazed paddocks, so there has been no significant affect on stock numbers which have been maintained at 17 000. The small area planted fits well with the stock policy, which has been to improve per head production at the existing stocking rate, with better lambing percentages and finishing levels.

Some early plantings have halted the slumping of critical areas, preventing further slumps up stream. This has given David and Karen the confidence to keep planting.

David has found that it is important to do a good job planting the

poles and to not cut corners to save time and money. Holes need to be bored, poles rammed in, and a protective sleeve put on.

The success of the pole planting has been good with 80 to 95 percent of the poles surviving and growing well. There have, however, been some failures especially where the land has slumped badly or stream banks have eroded before the trees established. The worst areas are continually being replanted as needed.

Stock damage has not been a major problem where sleeves are placed over the poles to protect them; the exception is poles planted in stock camps for shade which are damaged by cattle rubbing.

Pig rooting has been a problem in a few small retired areas. David has found that in most areas the poles need a good two to three years to establish. Some of the early plantings were badly damaged by possums but there is no problem with the possum resistant varieties now used.

"The cash cost of pole planting has been relatively low. Poles cost \$3 to \$4 each and sleeves are a similar price," says David. "We have our own nursery now, plus the Taranaki Regional Council now supplies poles. Other costs are time and transport. These are more than covered by the time and costs which are saved from having to do less maintenance to fences and tracks," says David. "Ultimately there has been a good return on our investment from the prevention of lost production and good grazing land."

PLANS FOR THE FUTURE

David and Karen's current plans are to continue pole planting on the high priority slumps and stream banks. The good success they have had on some severe slumps has encouraged them to continue. They

are starting to fence off the many swamps, wetlands and little lakes from stock. In the future, they plan to start planting the steeper gullies.

David is a member of the Hill Country Advisory Group that supports Taranaki Regional Council's South Taranaki and Regional Erosion Support Scheme (STRESS). The scheme, which focuses on treating erosion on South Taranaki hill country, has been granted \$1.1 million from MAF's Hill Country Erosion Fund to treat eroding land.



Successful 20-year pole planting.

MAINTENANCE OF POPLAR AND WILLOW POLES

Don Shearman, Taranaki Regional Council's Land Services Manager, says poles can and are successfully established on hill country, wherever soil is sufficiently deep and moist for them to take root. "Therefore, the most suitable species should be chosen for the site. Poles shouldn't be established on steep upper faces where little soil remains, or which dry out in the summer. If planted in the right places on a farm and maintained, poplar and willow poles contribute significantly to sustainable land management in the hill country by effectively controlling hill country erosion and protecting farm assets - in particular, the farm's soil assets from which the viability of the business is dependant."

Don says there are many benefits to be gained from maintaining poplar and willow poles. "Maintenance improves survival rates after establishment and increases the pole effectiveness against erosion."

"Loose poles should be re-rammed in the spring and early summer, so the developing roots are not damaged. Dead trees should be replaced the following year. Form pruning (see diagram) will ensure a single leader is retained so that the tree will develop good form, which will provide less shading and will be less prone to wind damage in storms. Trees planted at close initial spacings to achieve earlier soil stabilisation, should be thinned to their final spacings after 10 years. When managed properly, poplar and willow trees will provide long-term soil stabilisation, shade and shelter, and a potential timber resource if pruned."

Key points

1. A small area of Mangapapa Station is prone to slumping and there are major erosion problems along the stream banks; if left untreated large areas of the property would be put at risk.
2. David and Karen Peat have been operating a pole planting programme to stabilise pasture on slump terrain over 25 years. This was formalised with a farm plan developed by the Taranaki Regional Council, which expanded the programme into stream bank protection.
3. The Peats have been planting 200 to 600 poplar and willow poles per year with generally good results.
4. The time and cost involved in planting has been recouped by reducing fence and track maintenance and preventing the loss of good grazing land from production.
5. The protection planting has not led to a reduction in stock numbers run on the property, with the stocking rate maintained at 8 stock units per hectare.
6. Future plans include fencing off the swamps, wetlands and lakes and planting the steeper gullies.



Planting protecting farm tracks.

Successful planting of slumps.



FOR MORE INFORMATION

- Control of earthflow and slump erosion – Taranaki Regional Council. Go to www.trc.govt.nz and search under 'slump'.
- *Pole planting – maintenance* – Taranaki Regional Council. Go to www.trc.govt.nz and search under 'pole planting - maintenance'.
- South Taranaki Regional Erosion Support Scheme. Go to www.trc.govt.nz and search under 'stress'.
- Sustainable Land Management: Hill Country Erosion Programme (MAF). Go to www.maf.govt.nz and search under 'hill country erosion'.
- Soil Conservation Handbook – Ministry for the Environment. Go to www.mfe.govt.nz and search under 'soil erosion'.



Pruning

Year one

- After one year's growth, where there is little possum or wind damage, a sheltered site and multiple leaders will develop.
- Leave to develop until year three when selection can be made for the two or three dominant lead



Years three to five

- Broken and damaged leaders need to be removed from years three to five.
- These leaders would have been the ones to form a main leader, but possum and wind damage require that they be removed.
- In exposed areas it is critical that pruning is not undertaken too early as the one or two leaders left could suffer wind or possum breakage. This would destroy the pruned form of the tree and its potential to produce a quality butt log.



Years five to seven

- Remove one limb and prune the remaining two leaders.
- Remove side branches on these two leaders.
- Both leaders will have increased in diameter, size and form, and the decision will be able to be made as to which leader remains as the main trunk most suitable for timber production.
- If the top leader is removed then it is advisable to cut through the top of the pole (blue line) to reduce the possibility of die back.



Years six or seven

- The pole is now showing form and has been pruned to two leaders.
- Remove one leader and side prune the remaining leader. This last leader will now have good size and form, and should be able to stand reasonable winds without breaking off the top of the pole.

← Secondary leader prune ← Leader prune

Source: Taranaki Regional Council.

Published by Ministry of Agriculture and Forestry
PO Box 2526, Wellington 6140.
Freephone: 0800 008 333
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