

Slips: pasture production and revegetation March 2004

Once a farm has been hit with slips then the first priority must be to look after the home and family. Second is the need to get access to the farm. Tracks are roughly cleared to allow access to the farm and left to be tidied up later when the soil hardens. Gaps in fences are fixed and wandering stock are found and put back into stock-proof paddocks. Once a breathing space occurs the impact of slips on the farm business can be explored.

Firstly it is important to try and assess the overall loss in production that has occurred as a result of slipping. Slips are made up of face and tailings. The face is where the soil has been removed leaving a shallow soil with low moisture holding capacity and little organic matter and very low nitrogen levels. Faces are slow to revegetate. However, the face makes up only about 30% of the visible slip damage. The soil that was lost from the slip is found in the tailings. The tailings are a tumbled mixture of soil and buried vegetation. The tailing debris will revegetate within 6 to 12 months due to existing plant material and from dormant seeds already present in the upper soil layer. In some instances subsequent regrowth on these tailings is higher than equivalent non-eroded slopes. It is appropriate therefore to only consider the slip face as "lost" dry matter.

When calculating the immediate loss in dry matter, estimate the percentage of slip face and the steepness of the slopes involved. Slips often only occur on the steeper slopes (>28 degrees) which only have 60% of the productive capacity of flat/rolling country. Both pasture utilisation and quality is also lower on these steep slopes. It is possible over the next month (depending on cloud cover over the region at 11 am) that all farmers with more than 2% slip face damage on their farm will receive a satellite image indicating the area of slip face damage on their farm. Alternatively the damage can be visually assessed from the ground.

Estimated loss in consumable dry matter as a result of varying slip damage on a Central North Island farm of average topography (27% flat/rolling, 48% hill and 27% steep hill)

%slip face on hills	0	2	3	5	8
% slip on steep hills	3	9	15	25	42
Loss in annual consumed dry matter (%)	0.6	2.6	4.2	7	11.7

It is important to note that moderate slip damage often only produces the same loss in dry matter as a poor "growth" year and it is lucky that this year feed covers should be good going into the winter.

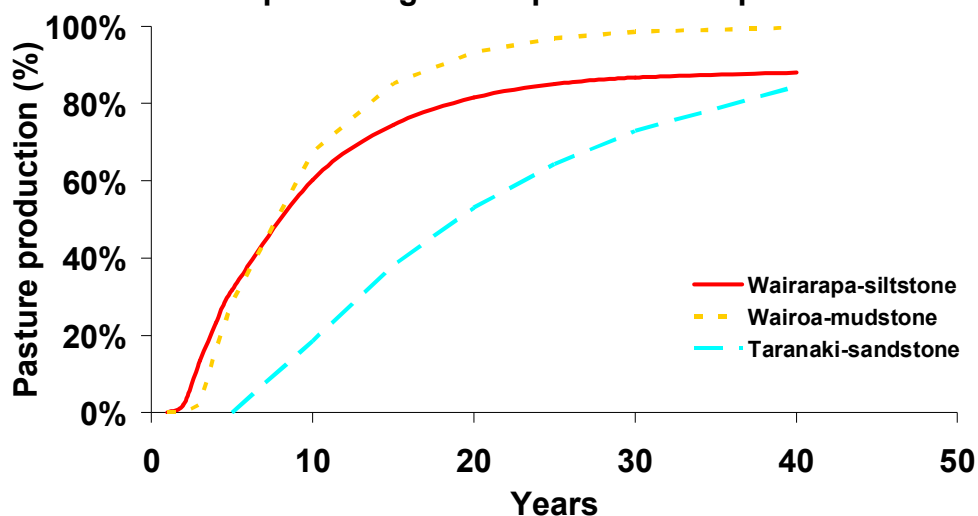
Having calculated the loss in dry matter, a new feed budget and response can be planned. Depending on the outcome, farm strategies may include culling stock early, bringing forward sale dates of stock, putting on more nitrogen or changing mating decisions. It is probable that increased expenditure on the stable areas is more economic than spending money to revegetate slips.

But slips are oversown for a number of reasons only a few of which may be based on sound economic principles. Such reasons include "speeding up the colonisation of the vegetation because I don't like looking at slips". Others may want to "stop donating even more soil to the waterways". Others may simply be "maintaining the marketability of their farm in terms of real estate".

The slip scar will naturally revegetate over time becoming colonised predominantly by legumes and low fertility tolerant pasture species. As time passes the amount of bare ground gradually disappears but soil is only slowly reformed. The shallow soil is prone to drying out and is not fertile. It takes 20 years or more for substantial recovery (see Figure below) and, in some soils, full recovery never occurs because soil depth and organic matter content remains less than that of non-eroded sites.

But it is important to realise that while you have been hit with an exceptional "slip" event, slips and erosion occur continuously on our hill country. There will be many places on your farm where old slips have occurred and are now revegetated.

Impact of slip age on pasture production as a percentage of slope with no slip



If you choose to oversow slip faces then there are a few guidelines that should be followed to improve your chance of success. Firstly it is essential that you use coated seed. Secondly, put the seed on at a time that gives the seed the greatest chance of germinating and establishing in the hostile slip environment. There is a risk of losing seed or seedlings either due to heavy rain and/or subsequent dry periods. Establishment can also fail if the slip has not stabilised properly. The risk of establishment failure will be greater on slips that are steeper and those with little residual soil. Slips arising from mudstone parent material will be easier to revegetate than those from siltstone, and sand-stone based soils will be the hardest of all.

Legumes have the greatest chance of colonising the low nitrogen environment that exists on slips. On the intensively grazed, fertile, summer moist, hills of the Manawatu, Taranaki and Rangitikei districts small-medium leaved "hill-country" cultivars of white clover should be the most effective legumes for slips recovery. Around 6 kg/ha of coated inoculated white clover seed should be sufficient though higher rates will result in greater plant numbers but at a greater cost. Seed is flown up the slips by a helicopter (approximate cost white clover + helicopter \$100/ha). The helicopter costs will be cheaper if a group of neighbours get together to sow slips. On dry slopes subterranean clover could be included in the mix. On slip areas permanently removed from grazing then lotus and red clover added to the other two legumes are good options in the mix.

In general terms in the Southern North Island oversowing can occur from March until around mid May, though keep an eye on dropping soil temperatures. In summer moist environments there is also a window of opportunity for oversowing from mid August to September. Success of oversowing will be increased if the area can be spelled to allow good establishment. In the few trials, oversowing has been shown to add about 1500 kg DM/ha/yr to the productive capacity of a slipped area over the first few years after slippage.

Once a slip face has recovered some vegetation, phosphate and sulphur and possibly lime will be important for supporting the legume growth as it develops. In trials, fertiliser boosted the benefit of oversowing by a further 600 kgDM/ha. However the normal farm fertiliser applications that occur in the modern era should be sufficient to support growth on slips. Nitrogen will only be of benefit once grass species become established.

There may be areas of slips that would benefit from tree planting. Highly recommended reading for soil erosion control can be found on this website <http://www.mfe.govt.nz/publications/land/soil-conservation-handbook-jun01/index.html>

Information contributors: This information has been compiled on behalf of MAF sustainable farming fund and Meat and Wool New Zealand using information provided from experienced farmers, researchers from AgResearch and Massey University and rural professionals from Greenfield's Communications, Dexcel, Wrightsons, Ravensdown, Agriseeds, Agricom, Balance, QuinPhos, Agricom, Pioneer, Hills Laboratory, Wilsons and Keeling, Horizons Regional Council, Pyne Gould Guinness, Williams and Kettle.