

Drastic Process to Re-contour Dunes

Craig Ross, Landcare Research

Re-contouring a farm is a drastic process. While economic gains are intended, some care along the way can promote better soil health and better farming later.

Paddocks in sand dune country have very variable soil patterns, generally with:

- shallow topsoils over raw sands on the upper parts of the dunes
- deeper topsoils on the lower dune slopes, and
- often peaty soils, sometimes with underlying iron pans and silty layering in the hollows between dunes.

The aim of re-contouring is to even out the soil pattern and change the contours to gently rounded or more flattened slopes which follow the natural lie of the land.

Topsoil is relaid evenly over recontoured subsoils, then open drains dug to remove water

The main damage from topsoil stripping and re-spreading is soil structural damage from machinery compaction, burial in the stockpile, and mechanical handling.



The sandy topsoils on Waitatapia Station tend to be poorly aggregated with single grains and structural degradation is not really an issue. Compaction can be a problem but is relieved by seedbed cultivation.

Topsoil in the core of stockpiles becomes temporarily anaerobic and may have patches of grey or greenish-grey colours with a pungent odour. However, research has shown that the topsoil recovers quickly when re-spread, although there may be a small flush of ammonium.

Earthworm populations can also temporarily diminish but populations are usually naturally low in sand dune soils and should recover in time.

Some of the re-contoured area is being converted to cropping from pine plantation. Stumps are removed so the wood slash is minimal. It will soon become broken down by natural decomposition.

Because decomposition of woody carbonaceous slash uses up some of the soil nitrogen, more nitrogen fertiliser than usual is required. Mulching the slash is an option, if the appropriate machinery is available.

Normal cropping on re-contoured sand country should work well because soil structural damage is minimal and easily remedied by cultivation.

Patchy iron pans in the underlying sands occurred in some small areas. Ripping to break up these pans will help drainage and root penetration. In effect, ripped iron pans will behave rather like a stony layer.



Ripping patchy iron pans will aid drainage and root penetration

It is early days for the Dalrymples' re-contouring of low sand dune country in the Manawatu. The cost-benefits of leveling the dunes will become known after two or three seasons.

A cautionary note: silty or clayey soils

On silty or clayey soils, soil structural damage when re-contouring is generally more severe. A period of restorative pasture is required before cropping is recommended.

A common problem in re-contoured land is layering at the interface between natural and re-spread soil materials. Compaction at the interface inhibits soil drainage and root penetration. It can be remedied by scarification by cultivation before adding re-spread soil, or by subsoiling after re-spreading.

Sudden textural changes and buried topsoils or silty layers also create these problems. These can be overcome by cultivating before re-spreading sand or topsoil or subsoiling. Buried topsoils should be stripped and added to the topsoil being re-spread.

Most of these problems were not observed in the sand country at Waitatapia. There were, however, small patches of underlying iron pans, silty layers and buried humic topsoils.

Ripping may not work as well for buried silty layers because they will re-consolidate. Instead, cultivation of the silty layer may be beneficial by mixing it with sand.