

# FUNDAMENTALS OF SOIL MANAGEMENT

## Core principle 2: Controlling Water Flow

### PRINCIPLE 2: INCREASING SOIL INFILTRATION POTENTIAL BY REDUCING THE SPEED OF RUNOFF



#### The issue

Slope steepness impacts soil erosion as water runs faster downhill and can concentrate. When water flow velocity exceeds the soils capacity to absorb water, sheet erosion occurs. Bare ground exacerbates this issue, increasing flow velocity, dislodging soil particles and carrying away valuable topsoil.

Overland flow concentrates volume & increases speed on slopes, increasing its erosive power.



#### Factors that influence surface flow speed

- Surface roughness
- Slope steepness
- Slope length

#### How to decrease runoff velocity & improve infiltration

##### Vegetation

- Groundcover intercepts and slows water, allowing rainfall and nutrients to infiltrate between aggregates and pore spaces.
- Vegetation improves soil health and structure - enhancing soil moisture capacity.



##### Reduce compaction

- Compaction increases bulk density and reduces crop yields.
  - Bulk density, the dry weight of soil over a unit volume of soil, is a useful measure of soil properties (pore space, organic matter content, compaction, and root growth potential).
- Bulk density is influenced by particle density (fraction of clay, sand, silt) however organic matter is critical to lower bulk density and improves structure and increase soil moisture capacity.



Contour ripping to increase infiltration and slow runoff

##### Contour ripping

- A roughened surface intercepts water flow, slowing it down and reducing its force.
- Ripping contour lines can reduce runoff and improve infiltration. It can be done upslope from erosion prone areas or on scalded areas.

Controlling water flow on your property maximises water infiltration on your land increasing soil moisture and resilience to dry conditions. Carefully plan runoff intercept systems as they involve changing how your farm is managed.

## Interception structures to slow flow

### Stick raked timber

- Opportunity to use fallen or sustainably cleared timber to reduce erosion on slopes.
- Stick rake lines should be arranged across the slope, on the level contour and designed to slow water, improving infiltration of water and nutrients.
- Alternate stick rake lines with access gaps. Placing the constructed lines across the contour downslope allows water to flow and drop into the next segment through the alternating gaps, reducing water velocity.



Stick rake lines on the contour slow runoff and improve infiltration

### Vegetated contour strips

- Terrace like bands of permanent, short, dense vegetation typically grasses, planted across slopes on the contour to intercept runoff and trap sediments.



Vegetated strips planted on the contour intercept runoff and trap sediments

### Constructed banks

- Divert water flows and break up slopes into shorter lengths to reduce runoff speed and transport water to a safe disposal (level sills) or storage area. e.g. contour banks run across a slope to intercept water allowing it to pond up behind the bank and infiltrate the soil.

**Note:** shape and type of bank design is site-specific and conducted using a laser level. This may need to be surveyed by a specialist.

## Monitoring for success

Monitor whether strategies to slow water down and improve infiltration are effective and if revegetation is occurring at impacted sites. Take pictures at a designated location annually to monitor the change over time.

**TAKE CARE: LAND THAT IS WATERLOGGED MAY BE PRONE TO MASS MOVEMENT - INCREASING INFILTRATION MAY LEAD TO LANDSLIPS.**

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