Water Movement & Drainage

Fact Sheet

Water management is one of the most important factors affecting land use and management. In a disturbed environment, even a small amount of water can cause erosion. The soil that is lost can be measured in tonnes per hectare and will never be recovered naturally.

Amount and energy (velocity) of rainfall and runoff

Storm intensity/unpredictability

The average annual rainfall in Central Australia is low. The intensity of actual storm events is high. Sudden, intense storms cause more damage.

Whenever a raindrop hits bare soil it disturbs the soil aggregates and splashes soil particles into the air. Once the soil is disrupted it is easily eroded. More intense rainfall causes an increase in disruption to bare soil.

It is important to maintain a good soil cover.

Runoff energy (velocity)

Most runoff occurs as sheet flow. A film of water spreads across the soil surface, having low volume, velocity and energy. In undisturbed areas this has low potential for erosion (See Figure 1).

However if runoff is concentrated in sheet flow areas (by a windrow), flow velocity and volume is increased. This leads to a higher risk of erosion (See Figure 2).

Sheet flow eventually accumulates in low lying drainage lines or depression areas, flowing towards streams or flood out areas (Figure 1). Drainage areas carry higher volumes of water at higher velocity, which increases down slope. These areas are generally stable when left undisturbed. However if the flow is diverted or concentrated the runoff energy increases and becomes erosive.

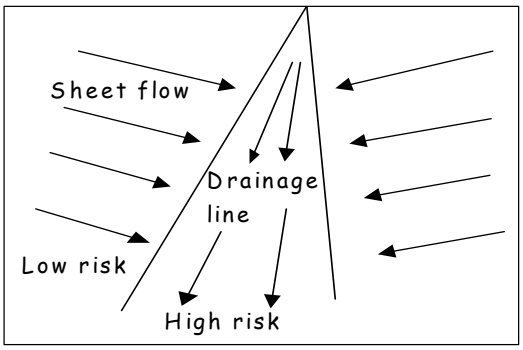

Figure 1: Sheet flow & drainage lines

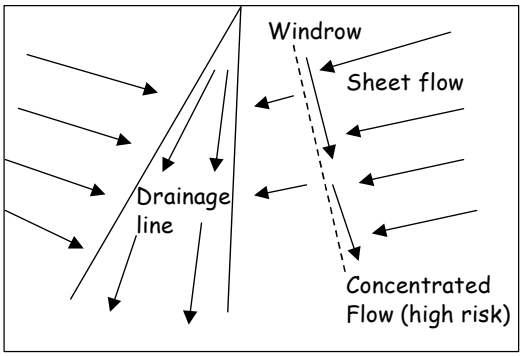

Figure 2: Concentration of sheet flow by windrow

Degree and Length of Slope

Degree of slope determines amount of runoff energy.

Gravity works on water, and what may seem like flat ground to the eye can be sufficiently sloping to create very rapid water flow. Rapid water flow can be very erosive (See Picture 1).

Length of slope – as water moves down a slope it picks up speed. The longer the slope is, the greater the speed and energy available to cause erosion.

Reduce the length of slope by removing runoff. For example, from roads by using mitre drains or whoa-boys (Figure 3), or by changes in track direction and spilling water off on the corners (Figure 4) or by constructing ponding and diversion banks (these require exact surveying).

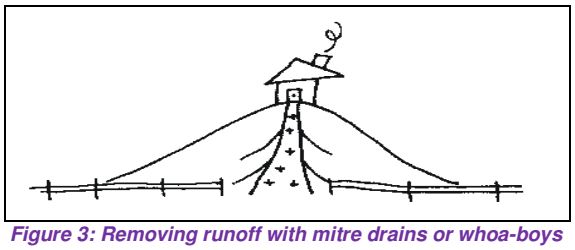

Figure 3: Removing runoff with mitre drains or whoa-boys

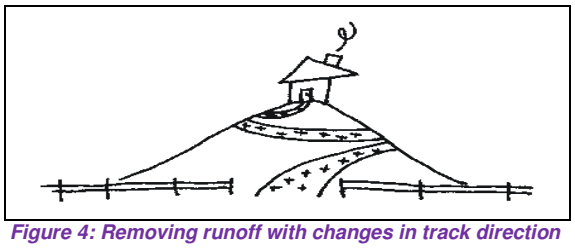

Figure 4: Removing runoff with changes in track direction

Never underestimate the slope of your land. Be aware that the length of the slope may extend well beyond your up-slope boundary fence but you will still receive the runoff. Be aware that the length of slope may extend well beyond your down slope boundary. Runoff from your land may impact on your down-slope neighbour.

Do not direct concentrated runoff into your neighbour's property!

Avoid locating tracks or fences directly up slopes. Shorten the slope by either running parallel to the contour or zigzag up the slope, or constructing diversion banks or drains to remove runoff from the track (See Picture 2).

So how do you identify water movement patterns?

Look for drainage lines, both on the ground and on aerial photographs or satellite images. Drainage lines can be identified by depressions, thick grass, greener grass, thick Mulga trees.

Picture 1: Poorly located roads directly up slope are prone to erosion

Picture 2: Whoa-boys at strategically placed intervals remove any concentrated runoff from the road.

Contact details

For further information contact the DLRM Land Management Unit in your region. Additional Fact Sheets are available on the website: http://www.lrm.nt.gov.au/soil/management

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