

MINIMISING EROSION FROM ROADWAYS AND FENCELINES

BACKGROUND

Rainfall naturally drains downhill crossing the land until finding a drainage line that channels it into a stream. With adequate vegetation there is little soil loss in all but the most severe rainfall events. Vegetative cover absorbs the impact of raindrops, reduces the amount of direct contact between the water and the soil and most importantly slows the velocity of runoff, allowing more water to infiltrate the soil profile.

A roadway or firebreak running across a hill slope regardless of its direction can interrupt this process by concentrating the water flow or allowing it to rapidly gain velocity. The faster water travels the greater its scouring and cutting force and the greater the chance of gullies forming across the landscape.

Leaving a windrow along the length of a roadway is the first step in the erosive process. Water hits the windrow and is channelled along it gaining speed and volume until enough has been collected to allow it to break through the windrow at a weak point.

At this stage the concentrated flow can easily start the scouring process if it can find a weakness in the soil surface. Animal tracks next to the road or wheel tracks along the road are ideal starting points.



Figure 1: This fence line fire break has been eroded to the point that it has become a gully.

CHECKBANKS

Once, for whatever reason water starts to run down a roadway it must be shed away as soon as possible. This is normally done by the use of roadside drains and check banks (also known as whoa-boys). Check banks can vary in size to suit



Figure 2: A roadway check bank, note the ponding of water in the sill on the left

the conditions but are formed up to allow the traffic up to the size of road trains to cross them. The banks are placed across the road parallel with the contour lines of the slope but with a 500:1 fall to move water slowly off the road. A well designed bank will reduce the velocity of the water that hits it, then allow it to flow to the downhill side of the road. The water should pool momentarily in the sill dug for that purpose and then slowly move off across the landscape. Care should be taken to ensure that the accumulated water is not run off into an existing gully. More than one check bank may be needed on longer slopes to ensure water is moved across the road incrementally. If water is diverted too far from its natural flow across the ground vegetation growth in those areas can be significantly reduced.

FURTHER INFORMATION

Please Contact Ord Land and Water
Phone 08 9169 2222
PO Box 1804
KUNUNURRA WA 6743
olw@olw.com.au



Australian Government



Government of
Western
Australia



RANGELANDS
NRM Co-ordinating Group



Additionally the higher number of banks installed the less the risk of water volumes and velocity eroding the roadway and surrounding landscape.

Check banks should always be put in with the aid of surveying



Figure 3: A well designed sill (background) dispersing water from a roadway

equipment to ensure the correct rate of fall and direction. Banks on gently sloping land can easily be put in facing the wrong way pushing the water to the uphill side of the road.

Soil to build the bank can come from a variety of sources but one common method is to remove soil from the downhill side of the bank. A broad shallow depression (sill) is dug out to build the bank and the depression remains becoming a settling pool for silt and the water moving off the road.

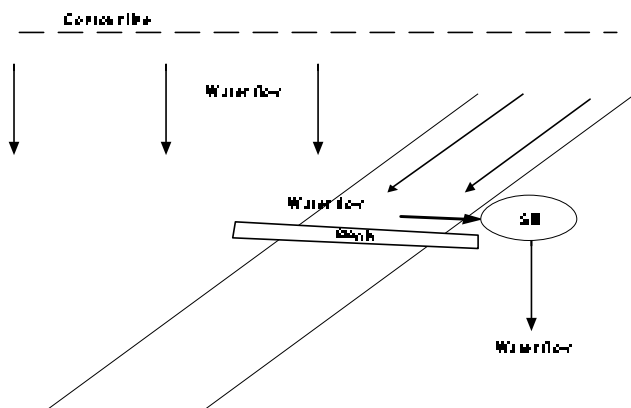


Figure 4: Diagram of a check bank installed on a roadway moving water across the road.

ROADSIDE DRAINS

Catch drains running down hill parallel to the road can be a major contributor to erosion. They are usually installed to keep water from flowing onto a road by diverting it downhill into an existing creek. This action has a significant impact on the vegetation on the roadway's downhill side and in many cases as the catch drain cuts wider due to erosion it starts to cut into the roadway itself. Installing catch drains should always be avoided.



Roadside drains that allow an exit point for water off

Figure 5: Gully from scoured out roadside V-drain.

roadways should

be flat bottomed and need only be long enough to ensure movement of water is away from the road. V-drains installed with the toe of a grader can cause a rill to form on longer slopes and should always be avoided. The level of the base of the drain must be below the level of the roadway otherwise water will bypass the drain. Drainage slopes should not divert water into a gully nor should they be steeper than 1:2000 to initially slow the water, then should revert to a slope of 1:500. Drains on the uphill side of the road are unnecessary as they will often divert water away from the roadway for a brief period before flowing back onto the road.

EROSION CONTROL ECONOMICS

Northern Territory studies in pastoral areas indicate the financial benefits of erosion control on roadways are in the order of:

- A reduction in maintenance time for access tracks of 30 - 50% .
- Travel time reduced by 5 - 10%.
- Fire break effectiveness increased by 2 - 5%.
- Good erosion control works along fencelines are only 15% the cost of replacing the fence line and reduce the risk of stock escaping from paddocks.

