USDA United States Department of Agriculture

Natural Resources Conservation Service

after the fire

Diversion

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CAUTION: After a fire many trees are weakened from burning around the base of the trunk. The trees can fall over or blow down without warning. Shallow-rooted trees can also fall. Therefore be extremely alert when around burned trees.

What is a diversion?

A runoff diversion consists of a channel and dike or ridge constructed across the slope to collect and divert runoff. The earthen channel may remain bare, or when necessary to protect it from erosion it will be lined with vegetation, turf reinforcement mats, or rock. The purpose of this practice is to divert excess surface water from one area for use or safe disposal in other areas.

When is a diversion used?

Diversions are used to divert runoff from burned areas away from values at risk. Diversions may be located:

- Above steep slopes to limit surface runoff onto the slope;
- At the base of slopes where flooding or sediment depositions may occur;
- Around buildings or areas that are subject to damage from runoff.

How is a diversion designed?

Diversions should be designed by an experienced engineer or technician. Important design considerations include:

Capacity. Diversion channels designed to protect areas such as minor buildings and roads shall have enough capacity for the runoff expected from a 25-year frequency, 24-hour duration storm.

Diversion

How is a diversion designed?

Diversions designed to protect major structures, homes, school buildings and high capacity roads shall have enough capacity for the 100-year frequency 24-hour duration storm.

Channel Shape. The channel may be parabolic, V-shaped, or trapezoidal in shape. Channel side slopes should be stable and not be steeper than 3:1. A ridge placed on the downstream side of the channel must be high enough to keep the runoff in the channel without overtopping. The ridge height should provide at least 6 inches of freeboard and have a top width of 4 feet or more.

Channel Slope. Runoff Diversion channels must be graded to prevent water standing and a design velocities greater than 1.5 feet per second to avoid sediment accumulation. Channels with design velocities greater than 2.5 feet per second will require some type of lining. Used the following as a guide:

Max. velocity (feet per second)	Channel slope (percent)	Recommended lining material
< 2.5	< 0.5%	Earth
2.5 - 4.5	< 2%	Vegetation, Mulched & Netted or Crimped Vegetation with Temporary TRM Earth & Permanent TRM
> 4.5	< 10%	Rock Vegetation with Permanent TRM
> 4.5	> 10%	Rock or concrete Permanent TRM

Outlets. Diversion channels must be able to deliver the runoff to a stable outlet, at a point where outflow will not cause damage. Some type of outlet structure or special lining over the outlet section of the diversion channel may be required.

What maintenance is required?

Runoff diversions should be inspected after every major rainfall. Any needed repairs to the channel, lining or dike must be made promptly to maintain diversion capacity, ridge height, lining integrity, and outlet stability.

Typical Runoff Diversion Cross Section