

**T**he establishment and control of proper vegetation is an important part of dam maintenance. Properly maintained vegetation can help prevent erosion of embankment and earth channel surfaces and aid in the control of burrowing animals. The uncontrolled growth of vegetation can damage embankments and concrete structures, making close inspection difficult. Thick brush and weed growth can obscure seepage problems, which can get progressively worse if left unnoticed.

## Trees and Brush

Trees and brush should not be permitted on embankment surfaces or in vegetated earth spillways. Extensive root systems can provide seepage paths for water. Trees that blow down or fall over can leave large holes in the embankment surface that will weaken the embankment and can lead to increased erosion. Brush obscures the surface, limiting visual inspection (see Figure 1), providing a haven for burrowing animals, and retarding growth of grass vegetation.

Trees and brush growing adjacent to concrete walls and structures may eventually cause damage to the concrete and should be removed.

## Tree Removal and Sprout Prevention

Stumps of cut trees should be removed, and cavities should be filled and covered with a short grass that can be easily maintained and mowed (see Figure 2). Stumps can be removed either by pulling or with equipment that will grind them down. All woody material should be removed to about six inches below the ground surface. Stumps of trees in rip-rap cannot usually be pulled or ground down, but can be chemically treated to prevent them from continually forming new sprouts.

## Guidelines by Zone for Tree Removal

The following guidelines are recommended when removing trees from a dam:

### Upstream Embankment

Remove all trees, stumps, rootballs, and root systems; clean rootball cavity; backfill with properly placed and compacted soil. Install rip-rap for wave erosion protection on the upstream slope from about four feet below the normal pool elevation to about three feet above normal pool elevation.

### Dam Crest

Cut trees with a stump diameter of twelve inches or less flush with the ground and treat the stump with a waterproof sealant to delay stump decay. Completely remove trees with a stump diameter of more than twelve inches and backfill rootball cavity with properly compacted soil.

### Downstream Embankment

Cut trees with a stump diameter of six inches or less level with the ground and treat the stump with a waterproof sealant to delay stump and rootball decay. Completely remove all trees with a stump diameter of more than eight inches and backfill the cleaned rootball cavity with compacted soil.

### Lower Portion of Embankment and Toe of Dam

Cut all trees with a stump diameter of four inches or less flush with the ground and treat to delay stump and rootball decay. Install a toe drain or subdrain system to lower the surface water level. The drain filter system will collect and discharge the seepage. Incorporate major subdrain when backfilling stump and rootball cavities where necessary. Remove all trees located up to 30 feet beyond the toe of the downstream slope with stump diameters of more than four inches. Install weighted filters and drain systems in rootball cavities where seepage boiling and soil piping are likely to occur.

Figure 1: Tree and shrub covered dam



## Tree Removal Tips

- When cutting trees for removal, at least one to two feet of the stump should be left above the ground. This ensures a well-defined stump can be used in the stump removal process.
- The stump and rootball should then be removed by pulling the stump upward with a track-mounted backhoe (or similar equipment) after loosening the rootball by pulling on the stump from different directions.
- The rootball cavity should be cleaned to remove loose soil and the remaining roots in the cavity should be removed using a backhoe. The cutting cavity side slopes are to be no steeper than 1:1. Cut a horizontal cavity for the bottom.
- Compacted soil should be a cohesive material, compacted in lifts no greater

than 8-inch loose lift thickness. Compaction is usually accomplished with manually-operated compaction equipment attached to a backhoe.

## Embankment Maintenance

Embankments, groins, areas adjacent to spillway structures, vegetated channels, and other areas associated with a dam require continual maintenance of the vegetative cover.

Grass mowing, brush cutting, and removal of woody vegetation (including trees) are necessary for the proper maintenance of a dam, dike, or levee. All embankment slopes and vegetated earth spillways should be mowed at least twice per year.

Trees and brush should be removed in all areas within 30 feet of the embankment. Well-tended grasses

improve aesthetics, simplify inspections, create a non-erodible surface, and discourage burrowing animal habitation.

Chemical spraying and burning for the purpose of regular maintenance are no longer acceptable methods of vegetation control near a water body. More acceptable methods include the use of weed whips or power brush-cutters and mowers. If chemical spraying is used, utmost care should be taken to protect the local environment. To protect the integrity of the embankment, mowing with heavy equipment when wet should be avoided. Only proper equipment designed specifically for the type of slope and vegetation should be utilized following the manufacturer's recommended safe operation procedures.

Figure 2: A properly maintained dam using short grasses without trees or shrubs

