

Earthen Dams:

Guidance on Tree and Stump Removal



This guidance is meant as general advice. Tree and stump removal on dam embankments is highly site-specific and must be evaluated on a case-by-case basis. Final decisions regarding the need for, extent of, and method of tree or stump removal will be made at the discretion of the Dam Safety Office (DSO) engineer. Dam owners who are advised to remove large trees or stumps may be asked to submit a Tree and Stump Removal Plan to DSO for review and approval prior to beginning any removal work.

Trees are Dangerous to Earthen Dams

- Roots create seepage paths that can lead to internal erosion (piping) when roots die and decay.
- Uprooted trees pull out soil, leaving large cavities and reducing the dam's ability to resist water pressure.
- Trees block inspections—critical for early failure detection—hiding cracks, wet spots, sinkholes, or slumps.
- Roots damage pipes and drains, intruding into joints and reducing proper function of outlet works and underdrains.
- Vegetation encourages burrowing animals, which further weaken the dam.

Guidance on Tree Removal

Cutting trees at ground level is not enough except for very small vegetation. Tree removal should include stump, rootball, and major lateral roots.

Cut tree

Leave a stump approximately 2 feet above the ground for leverage.

Extract stump and rootball

Use an excavator or winch, removing major roots over 2" in diameter.

Shape the excavation

Side slopes must be no steeper than 1:1 with a flat bottom.

Fill holes and depressions

Type of fill you use will depend on the area of the dam and type of erosion protection on the dam.

Upstream side

Use a bentonite/soil mix or a premade bentonite cement mix.

Downstream side

Use a layer of sand at the bottom of the excavation and backfill with similar dam embankment material.

Backfill in 8-inch lifts, compacting each lift to 95% density.

1. Install drain/filter layers if in seepage zones (lower downstream slope & toe).
2. Seed and mulch to re-establish grass cover.

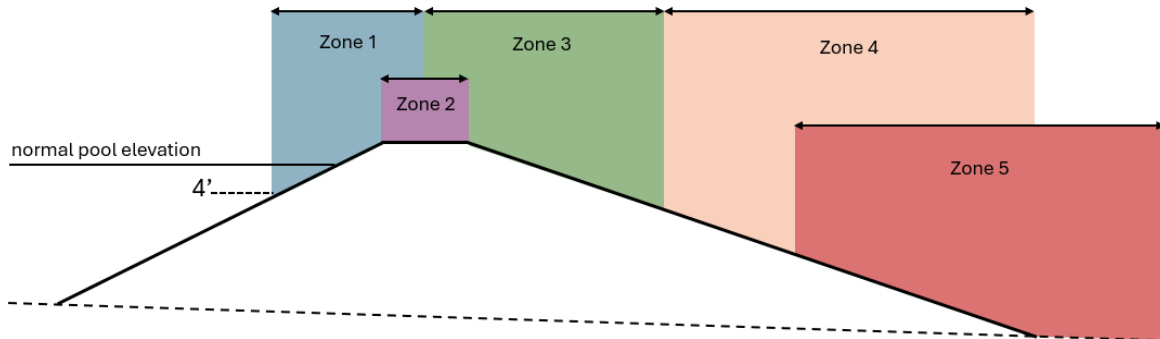
Safe Use of Herbicides

Herbicides may help prevent regrowth only when full removal cannot occur immediately.

1. Follow all label requirements and environmental restrictions.
2. Consult local NRCS or Cooperative Extension offices for guidance.
3. Do **not** rely on herbicide alone for long-term safety.

Tree Size Limit for Cutting vs. Full Removal

Different areas of the dam have different tolerances.



Upstream Slope (Zone 1)

- All trees of any size must be fully removed.

Crest (Zone 2)

- Trees < 12 inches: cut flush and treat stump.
- Trees ≥ 12 inches: full stump and root removal.

Upper Downstream Slope (Zone 3)

- Trees < 8 inches: cut flush and treat stump.
- Trees ≥ 8 inches: full removal.

Lower Downstream Slope (Zone 4)

- Trees < 6 inches: cut flush and treat stump.
- Trees ≥ 6 inches: complete stump/root removal + subdrain/filter installation.

Toe & Beyond (Zone 5)

- Trees < 4 inches: cut flush and treat stump.
- Trees ≥ 4 inches: full removal, and possibly a weighted filter system if seepage is present.

When to Leave a Stump

On a case-by-case basis DSO permits stumps to remain in place for up to five years, allowing roots to lose strength, making excavation and root chasing easier.

To reduce the risk of internal erosion and slope instability, dam owners will be required to:

- Monitor stump and root decomposition
- Track void formation
- Annually report observations to DSO

When to Call a DSO Engineer

These are critical safety warnings and may indicate developing failure. Call DSO immediately if you observe:

- New or increasing seepage
- Muddy or cloudy water discharge
- Cracks, slumps, or sinkholes
- Sudden wet spots
- A fallen tree exposing a hole
- Significant tree growth in Zones 4 or 5



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