How to Estimate Tons Per Acre or Tons Per Pile of Orchard Tear-Out Debris

Use these instructions when applying for Ecology's Pile Burn Permit.

Method	When to use	Variables	Calculation	Example
Method 1: Estimate tons of wood per acre you propose to burn* Relies on the relatively constant growth rate of .7 tons per year (in terms of wood volume) of orchard trees.	Use when: • you know the age of the trees to be torn out, and • you are satisfied that the tonnage calculated adequately describes the amount to be burned.	• Number of acres of orchard torn out = **N** • Age of trees torn out = **A** • Tons to be burned = ***T***	***T*** = **N** x **A** x 0.7	For a 20- acre orchard tear-out with 12-year-old trees: • ***T*** = 20 acres x 12years x 0.7tons/acre/year = 168 tons • Fee for 168 tons = 80 ton base fee of $80 + 88 tons @ $1.00/ton = $88 = $168 total
Method 2: Find the tonnage of a pile of natural vegetation** Determines the volume of your burn pile in order to figure out tonnage. Uses the cubic feet (ft^3) of the pile (or V for volume) multiplied by the weight (density) of the wood in the pile (55 lbs/ft^3 for green apple wood) multiplied by the packing ratio (conservatively 15%, because 85% of the pile is air in most stacked piles).	Use when: • you don't know the age of the trees to be burned, or • you have removed some of the wood for chipping or firewood.	• Cubic feet of the pile = V (volume) • Weight/density of the wood in the pile = 55 lbs. per cubic ft. for green apple wood (most other fruit woods are of similar density) • Packing ratio = 15% (in other words, 85% of the pile volume is made up of air) • Height of the pile = h • Diameter of the pile = d • π = 3.14	• Step 1: For roughly circular piles, the calculation is: $V=(\pi \times h \times d \times d)/8$ • Step 2: After calculating volume, divide the volume by 242 to take into account the density of the natural vegetation in the pile and the packing ratio.	For a roughly circular pile that is 20 feet tall (h) and 40 feet across (d): • V = (3.14 x 20 x 40 x 40) / 8 which equals 12,560 cubic feet of material • 12,560 ÷ 242 = 51.9 tons of material • Fee for 51.9 tons = less than 80 tons = base charge: $80 (See Ecology Pile Burn Permit Application for more Fee Information)

* See Ecology Publication #10-02-047, *Orchard Chipping Grant Report*

**Formulas taken from USDA Forest Service Publication, *Guidelines for Estimating Volume, Biomass, and Smoke Production for Piled Slash*

Publication no. 10-02-045
(Rev. 02/13)