Table 1 PM-10 EMISSIONS CALCULATIONS FOR PILES

1. Choose the pile size most representative of the piles on your burn site.
2. Multiply the number of piles in your project with the corresponding "Tons of PM10/Pile" value to get the total PM10 tonnage.

PM10 EMISSIONS FOR SPECIFIED PILE SIZES		
PILE SIZE (in feet)	**Pile Tonnage**	**TONS OF PM10/PILE**
4′ diameter x 3′ height	0.056	0.0005
5′ diameter x 4′ height	0.12	0.001
6′ diameter x 5′ height	0.21	0.002
8′ diameter x 6′ height	0.45	0.004
10′ diameter x 6′ height	0.71	0.007
12′ diameter x 8′ height	1.3	0.01
15′ diameter x 8′ height	2.1	0.02
20′ diameter x 10′ height	4.7	0.04
25′ diameter x 10′ height	7.4	0.07
50′ diameter x 10′ height	29	0.3
Pile Tonnage calculated using paraboloid volume formula[a] multiplied by 30 lbs/cu.ft, multiplied by 0.2 packing ratio[b]		
U.S. Forest Service's Conformity Handbook, Table 6 -- PM10 Emissions Factor of 19.0 pounds/ton of fuel burned - average pile and burn slash		
Revised 2/13/2001		

a. Formula used for Paraboloid Volume (cu.ft.) = 3.1416 x [height x (diameter)^2]/8 (see Refernce b. below).
b. USDA (2/1996). Forest Service General Technical Report. Report Number: PNW-GTR-364.

Table 2 PM 10 EMISSION CALCULATION FOR BURNING OF MULTIPLE FUEL TYPES[1,2]

Section 80160 (b) of Subchapter 2 Smoke Management Guidelines for Agricultural and Prescribe Burning, Title 17, California Administrative Code states, "requires the submittal of smoke management plans for all burn projects greater than 10 acres in size or estimated to produce more than 1 ton of particulate matter". To determine what the particulate matter (PM 10) amount is of your burn project please use the equation below and review the following examples.

Information needed for PM 10 Calculations:

a. VT = Vegetation type
b. ACRES VT = Estimated number of acres for VT
c. FL est. = Estimated fuel loading in VT TONS per ACRE
d. EV = PM10 emission/ton of fuel

Calculating PM10 Emissions from Prescribed Burning of multiple vegetation types:
PM10 ton(s) emissions per VT = (number of acres VT) (FL tons per acre) (Emission Value (EV)) = _____ ton(s)/VT
PM10 ton(s) emissions per VT = (number of acres VT) (FL tons per acre) (Emission Value (EV)) = _____ ton(s)/VT
Sum Total is the Estimated PM 10 for the project = _____ ton(s)/project

VEGETATION TYPE(S)	**ACRES (VT)**	**x**	**FL est.**	**x**	**EV[1]**	**PM10 EMISSIONS (ton(s))**
Basing Sage/Low Sage	(_____)	x	(_____)	x	(0.010) =	_____
Ceanothus	(_____)	x	(_____)	x	(0.010) =	_____
Chamise	(_____)	x	(_____)	x	(0.009) =	_____
Giant Sequoia	(_____)	x	(_____)	x	(0.007) =	_____
Grass/Forb	(_____)	x	(_____)	x	(0.007) =	_____
Hackberry Oak	(_____)	x	(_____)	x	(0.005) =	_____
Hardwood (Stocked)	(_____)	x	(_____)	x	(0.003) =	_____
Hardwood (Non-stocked)	(_____)	x	(_____)	x	(0.003) =	_____
Jeffrey Pine/Knobcone	(_____)	x	(_____)	x	(0.007) =	_____
Live Oak (Canyon)	(_____)	x	(_____)	x	(0.007) =	_____
Live Oak (Interior)	(_____)	x	(_____)	x	(0.007) =	_____
Lodgepole Pine	(_____)	x	(_____)	x	(0.007) =	_____
Manzanita (Productive Brush)	(_____)	x	(_____)	x	(0.009) =	_____
Mixed Chaparral/Montane	(_____)	x	(_____)	x	(0.008) =	_____
Mixed Conifer	(_____)	x	(_____)	x	(0.006) =	_____
Oak (Black)	(_____)	x	(_____)	x	(0.005) =	_____
Oak (Blue)	(_____)	x	(_____)	x	(0.003) =	_____
Oak (White)	(_____)	x	(_____)	x	(0.003) =	_____
Pinyon Pine	(_____)	x	(_____)	x	(0.007) =	_____
Ponderosa Pine, Gray Pine	(_____)	x	(_____)	x	(0.007) =	_____
Red Fir	(_____)	x	(_____)	x	(0.007) =	_____
Wet Meadow	(_____)	x	(_____)	x	(0.004) =	_____
Willow	(_____)	x	(_____)	x	(0.007) =	_____
Sum Total of the Estimated PM10 for the project in tons/project					**=**	_____

1. See Table 3 on next page for values used to calculate EVs.
2. For vegetation types not listed, contact Air District for assistance with determining appropriate emission factors.

Table 3
EMISSION VALUES (EVs) FOR BURNING OF MULTIPLE VEGETATION TYPES*

Calculation of PM10 emission values = (% combustion) x (PM10 emission lbs/ton) x (1 ton/2000 lbs)*

VEGETATION	%Combustion		PM Emissions (lbs/ton fuel)		Conversion Factor	PM EMISSION VALUE (PM10 tons emissions/ton fuel)
Basing Sage/Low Sage	= (1.0)	x	(20.17 lbs/ton)	x	(1 ton/2000 lbs)	= 0.010
Ceanothus	= (1.0)	x	(20.17 lbs/ton)	x	(1 ton/2000 lbs)	= 0.010
Chamise	= (0.9)	x	(20.17 lbs/ton)	x	(1 ton/2000 lbs)	= 0.009
Giant Sequoia	= (0.6)	x	(25 lbs/ton)	x	(1 ton/2000 lbs)	= 0.007
Grass/Forb	= (1.0)	x	(15 lbs/ton)	x	(1 ton/2000 lbs)	= 0.007
Hackberry Oak	= (0.4)	x	(25 lbs/ton)	x	(1 ton/2000 lbs)	= 0.005
Hardwood (Stocked)	= (0.4)	x	(15 lbs/ton)	x	(1 ton/2000 lbs)	= 0.003
Hardwood (Non-stocked)	= (0.4)	x	(15 lbs/ton)	x	(1 ton/2000 lbs)	= 0.003
Jeffrey Pine/Knobcone	= (0.6)	x	(25 lbs/ton)	x	(1 ton/2000 lbs)	= 0.007
Live Oak (Canyon)	= (0.6)	x	(25 lbs/ton)	x	(1 ton/2000 lbs)	= 0.007
Live Oak (Interior)	= (0.6)	x	(25 lbs/ton)	x	(1 ton/2000 lbs)	= 0.007
Lodgepole Pine	= (0.6)	x	(25 lbs/ton)	x	(1 ton/2000 lbs)	= 0.007
Manzanita (Productive Brush)	= (0.9)	x	(20.17 lbs/ton)	x	(1 ton/2000 lbs)	= 0.009
Mixed Chaparral/Montane	= (0.8)	x	(20.17 lbs/ton)	x	(1 ton/2000 lbs)	= 0.008
Mixed Conifer	= (0.6)	x	(20.5 lbs/ton)	x	(1 ton/2000 lbs)	= 0.006
Oak (Black)	= (0.4)	x	(25 lbs/ton)	x	(1 ton/2000 lbs)	= 0.005
Oak (Blue)	= (0.4)	x	(15 lbs/ton)	x	(1 ton/2000 lbs)	= 0.003
Oak (White)	= (0.4)	x	(15 lbs/ton)	x	(1 ton/2000 lbs)	= 0.003
Pinyon Pine	= (0.6)	x	(22 lbs/ton)	x	(1 ton/2000 lbs)	= 0.007
Ponderosa Pine, Gray Pine	= (0.6)	x	(25 lbs/ton)	x	(1 ton/2000 lbs)	= 0.007
Red Fir	= (0.6)	x	(23.1 lbs/ton)	x	(1 ton/2000 lbs)	= 0.007
Wet Meadow	= (0.6)	x	(15 lbs/ton)	x	(1 ton/2000 lbs)	= 0.004
Willow	= (0.6)	x	(25 lbs/ton)	x	(1 ton/2000 lbs)	= 0.007

*** Percent combustion and PM10 emission factors for various fuel types derived from Table 8, Section 6, "Air Quality Conformity Handbook" from the USDA-Forest Service Air Resources / Fire Management Pacific Southwest Region dated November 1995.**

**** These are the vegetation's estimated emissions values(EV) from the vegetation type as determined above to be use when the burn operator provides the vegetation's fuel loading estimate per acre.**

***** For additional information on emissions factors, see EPA document AP-42: "Compilation of Air Pollutant Emission Factors. Volume 1: Stationary Point and Area Sources," Fifth Edition, AP-42, January 1995, U.S. EPA. Table 2.5-5.**