

PRESCRIBED FIRE EMISSIONS ESTIMATE

Emission Factors

Fuel	Emission Factors (lb/ton)						
	NOx ^a	CO	SO ₂ ^a	Pb	VOC ^b	PM10	PM2.5
Slash	4.80	153.00	2.10	0.00	8.00	12.40	10.80
Conifer - Long Needle	4.80	178.00	2.10	0.00	6.40	25.00	22.00
Conifer - Short Needle	4.80	312.00	2.10	0.00	7.20	23.10	21.80
Conifer - Mixed	4.80	201.00	2.10	0.00	9.80	20.50	18.80
Grassland ^c	0.00	101.00	0.00	0.00	15.00	15.74	15.01
Sagebrush	4.40	206.00	1.40	0.00	13.70	29.90	26.70
Chaparral	4.40	154.00	1.40	0.00	19.60	20.10	17.30
Pinyon/Juniper	5.10	163.00	2.10	0.00	10.40	20.40	18.70
Hardwood	2.00	256.00	2.10	0.00	10.80	25.00	22.40
Palmetto/Gallberry ^d	4.40	206.00	1.40	0.00	13.70	29.90	26.70
other (average of all)	3.95	193.00	1.68	0.00	11.46	22.20	20.02

SOURCE (unless otherwise stated): “NWGC Smoke Management Guide for Prescribed Fire,” National Wildfire Coordinating Group (NWCG), Fire Use Working Team, November 2020.

a. SOURCE: Johnson, T.J.; Yokelson, R.J.; Akagi, S.K.; Burling, I.R.; Weise, D.R.; Urbanski, S.P.; Stockwell, C.E.; Reardon, J.; Lincoln, E.N.; Profeta, L.T.M.; Mendoza, A.; Schneider, M.D.W.; Sams, R.L.; Williams, S.D.; Wold, C.E.; Griffith, D.W.T.; Cameron, M.; Gilman, J.B.; Warneke, C.; Roberts, J.M.; Veres, P.; Kuster, W.; de Gouw, J. 2013. Final Report for SERDP Project RC-1649: Advanced Chemical Measurements of Smoke from DoD-Prescribed Burns. Technical Report PNNL-23025. Richland, WA: U.S. Department of Energy, Pacific Northwest National Laboratory. 269p.

b. Emission factor given for VOC is the same as that provided in the source document for non-methane hydrocarbons.

c. Section 2.5 – “Open Burning, “Compilation of Air Pollutant Emission Factors – Volume I: Stationary Point and Area Sources, Fifth Edition, U.S. Environmental Protection Agency, January 1995.

d. Emission factors for sagebrush used.

Pb assumed 0.00, no data available.

Fuel	Emission Factors (lb/ton)			
	CO ₂	N ₂ O ^a	CH ₄	CO ₂ e ^b
Slash	3,349	0.46	9.40	3,721
Conifer - Long Needle	3,202	0.46	8.20	3,544
Conifer - Short Needle	3,082	0.46	11.00	3,494
Conifer - Mixed	3,165	0.46	12.80	3,622
Grassland ^c	2,149	0.08	4.50	2,285
Sagebrush	3,126	0.46	11.90	3,561
Chaparral	3,257	0.46	5.70	3,537
Pinyon/Juniper	3,231	0.46	12.00	3,668
Hardwood	3,072	0.46	13.20	3,539
Palmetto/Gallberry ^d	3,126	0.46	11.90	3,561
other (average of all)	3,076	0.42	10.06	3,453

SOURCE (unless otherwise stated): “NWGC Smoke Management Guide for Prescribed Fire,” National Wildfire Coordinating Group (NWCG), Fire Use Working Team, November 2020.

a. SOURCE: Section 13.1 – “Wildfires and Prescribed Burning,” Compilation of Air Pollutant Emission Factors – Volume I: Stationary Point and Area Sources, Fifth Edition, U.S. Environmental Protection Agency, October 1996.

b. CO₂e calculated by summing the product of the emission factors for CO₂, N₂O, and CH₄ and their respective Global Warming Potentials (GWP). The emission factors were taken from 40 CFR 98 Tables C-1 and C-2 and the GWP for CO₂, N₂O, and CH₄ are 1, 298, and 25, respectively.

c. Section 2.5 – “Open Burning, “Compilation of Air Pollutant Emission Factors – Volume I: Stationary Point and Area Sources, Fifth Edition, U.S. Environmental Protection Agency, January 1995.

d. Emission factors for sagebrush used.